SLV-E820B/E820BZ/E820NP/E820UX/E820VC/E870EG/ E920B/E920NP/E920UX/E920VC

RMT-V195/V195A/V195B/V196/V196A/V196B

SERVICE MANUAL

French Model
SLV-E820B/E820BZ/E920B
Spanish Model
SLV-E820NP/E920NP
UK Model
SLV-E820UX/E920UX
German Model
SLV-E820VC/E920VC
Greek Model
SLV-E870EG

H MECHANISM

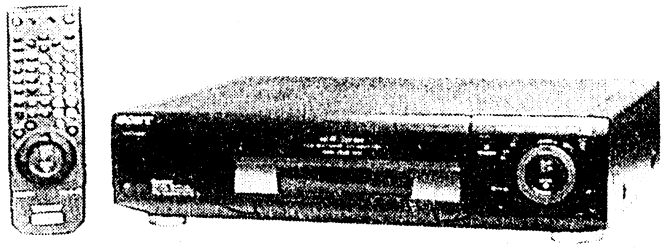


Photo: SLV-E920VC

Hi-Fi

VIDEOPlus+

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS IV for MECHANICAL ADJUSTMENTS. (9-973-623-11)**

* The abbreviations of E820, E870 and E920 contained in this service manual are indicated when these models are common to all their corresponding models as given below.

Abbreviated model name	E820	E870	E920
All model names SLV-	E820B E820BZ E820NP E820UX E820VC	E870EG	E920B E920NP E920UX E920VC

SPECIFICATIONS

System
Channel coverage
E820UX/E920UX:
PAL
UHF E21 to E69
E820B/E820BZ/E920B:
SECAM (L)
VHF F2 to F10
CATV B to Q
HYPER S21 to S41
UHF F21 to F69
PAL (B/G)
VHF E2 to E12
VHF Italian channel A to H
CATV S01 to S05, S1 to S20
HYPER S21 to S41
UHF E21 to E69
E870EG:
PAL
VHF IA to IJ, SA10 to SA13
UHF B21 to B69
CATV S01 to S05, S1 to S20
HYPER S21 to S41
E820NP/E820VC/E920NP/E920VC:
PAL (B/G)
VHF E2 to E12
VHF Italian channel A to H
UHF E21 to E69
CATV S01 to S05, S1 to S20
HYPER S21 to S41
RF output signal
UHF channels 21 to 69
Aerial out
75-ohm asymmetrical aerial socket

Inputs and outputs
LINE-1 (TV)
21-pin
Video input: pin 20
Audio input: pins 2 and 6
Video output: pin 19
Audio output: pins 1 and 3
LINE-3 IN: E820/E870
LINE-4 IN: E920
21-pin
Video input: pin 20
Audio input: pins 2 and 6

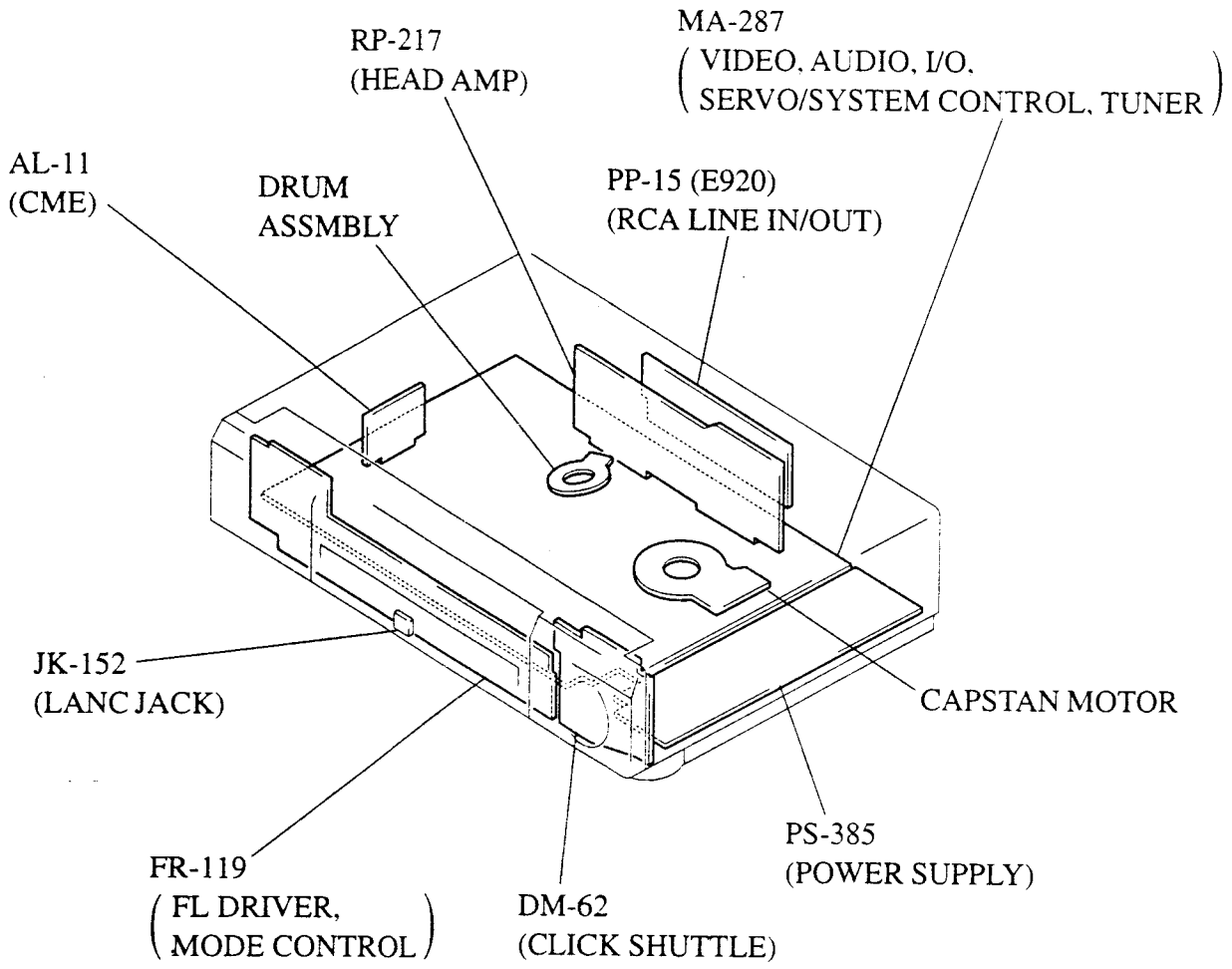
– Continued on next page –

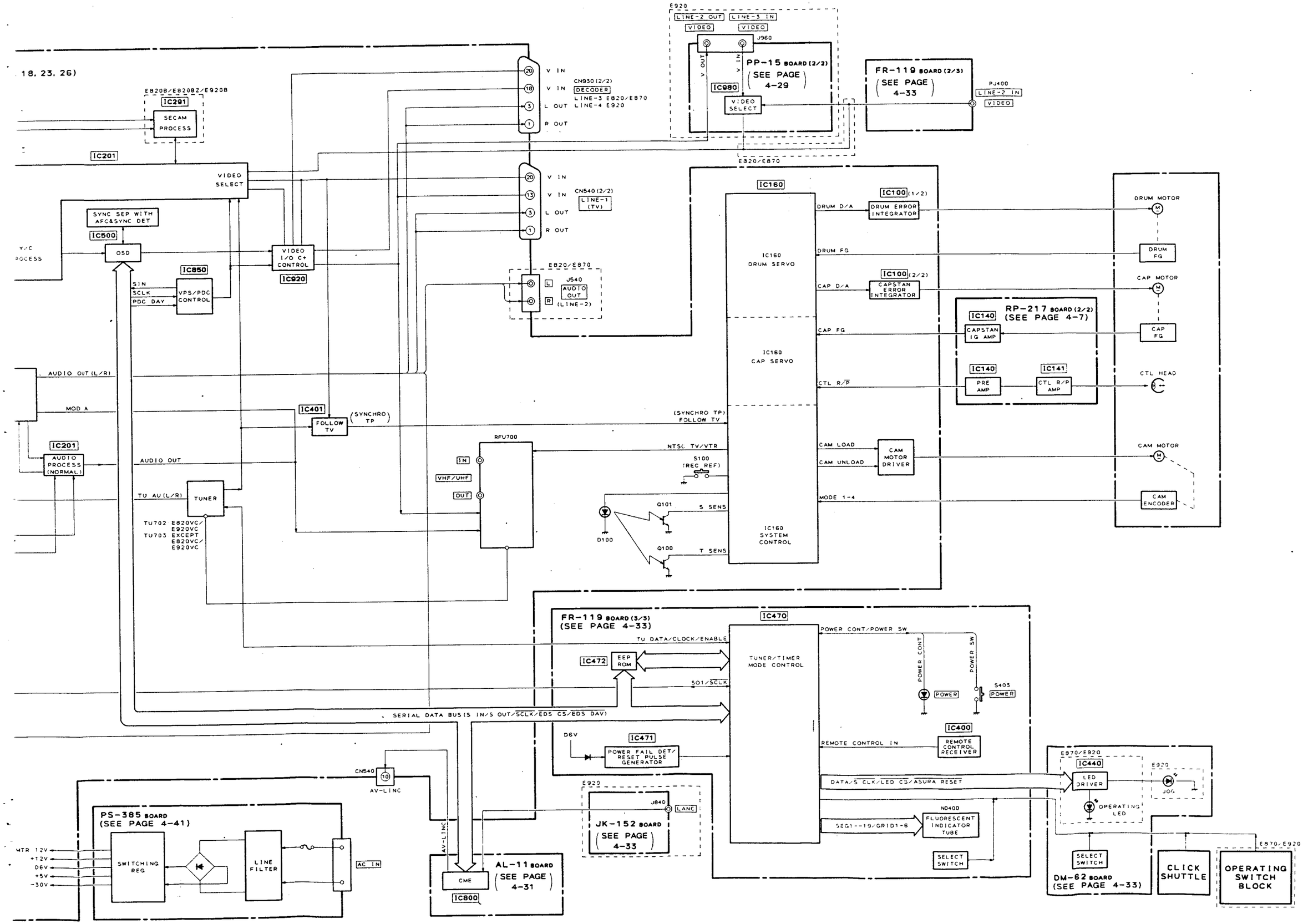
VHS PAL NTSC4 43 VIDEO CASSETTE RECORDER

MICROFILM

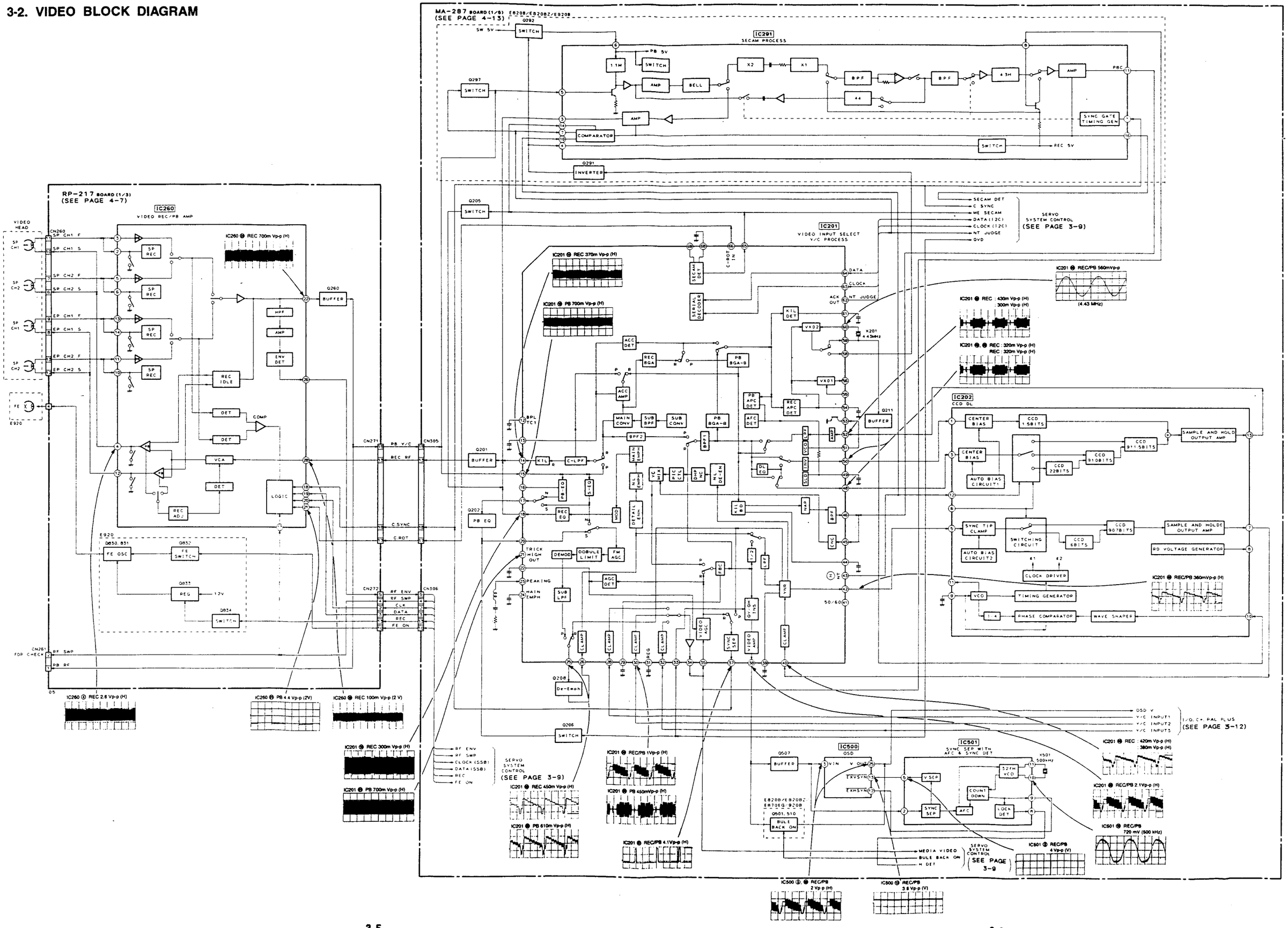
SONY®

2-10. CIRSUIT BOARDS LOCATION

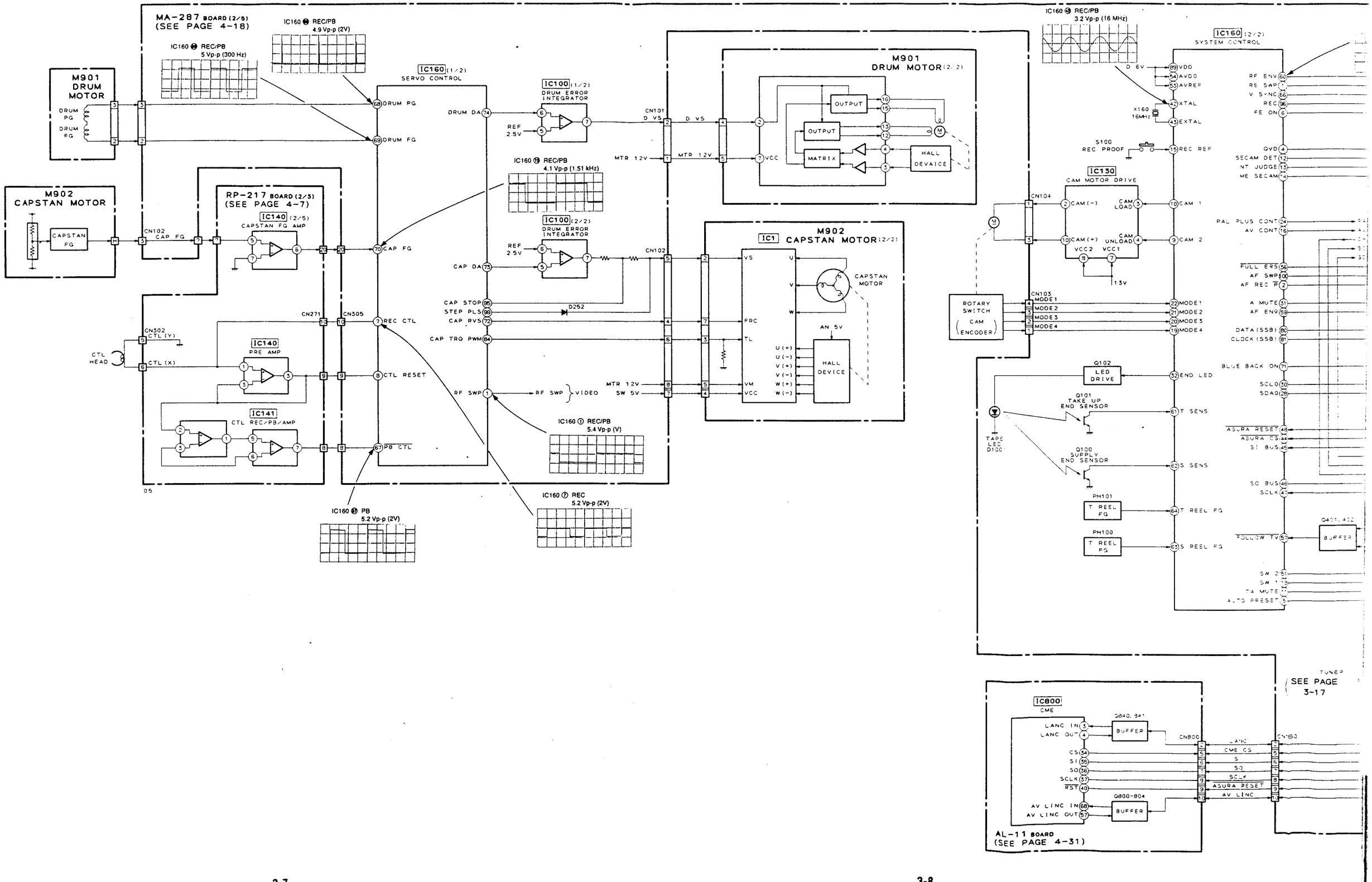


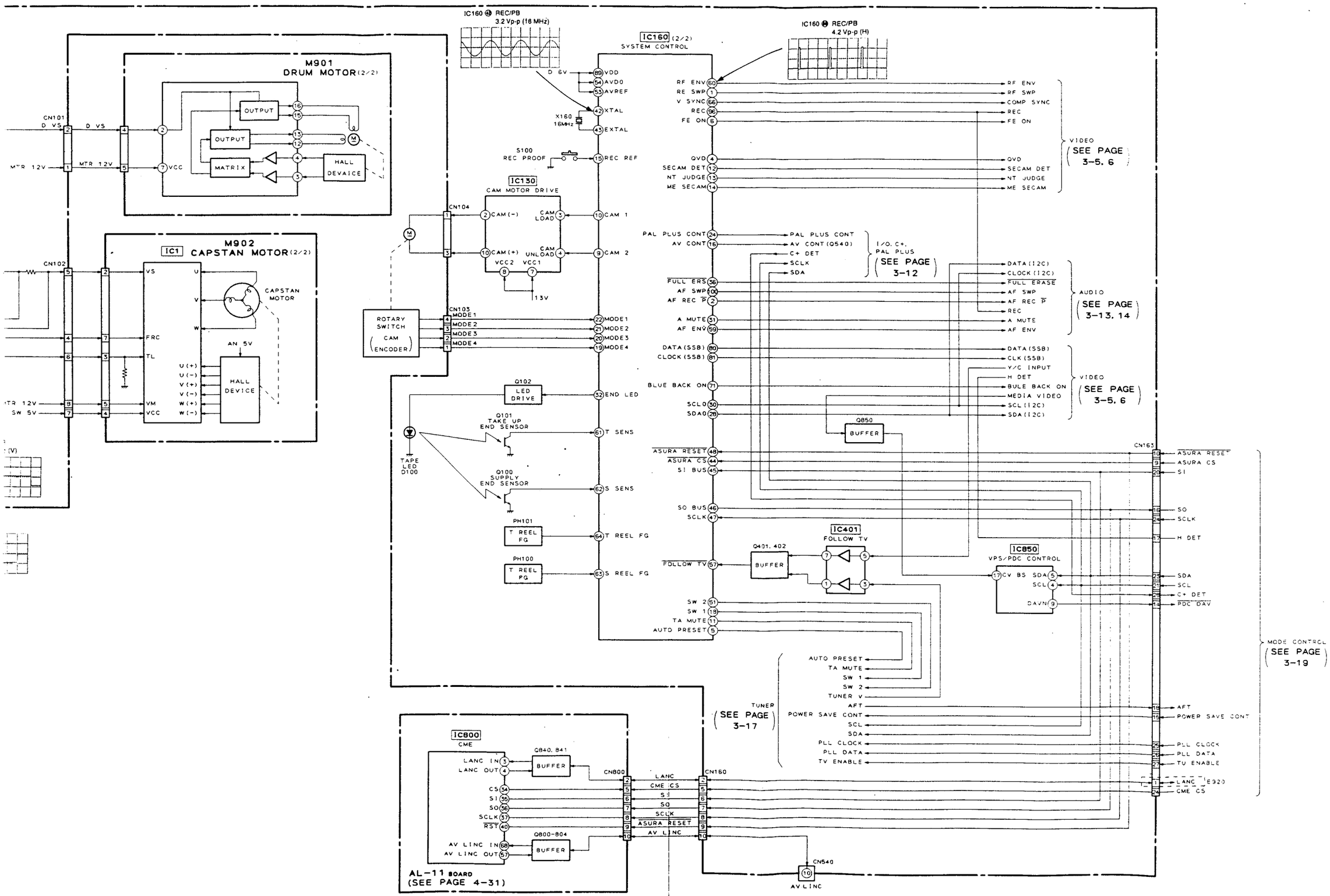

18, 23, 26)
E820B/E820BZ/E920B
IC291
SECAM PROCESS
IC201
VIDEO SELECT
SYNC SEP WITH AFC&SYNC DET
IC500
OSD
Y/C PROCESS
VIDEO I/O C+ CONTROL
IC920
IC850
SIN
SCLK
PDC DAY
VPS/PDC CONTROL
AUDIO OUT (L/R)
MOD A
IC201
AUDIO PROCESS (NORMAL)
AUDIO OUT
TU AU (L/R)
TUNER
TU702 E820VC/E920VC
TU703 EXCEPT E820VC/E920VC
IC401
FOLLOW TV
(SYNCHRO TP)
RFU700
IN
VHF/UHF
OUT
V IN
V IN
L OUT
R OUT
CN930 (2/2)
DECODER
LINE-3 E820/E870
LINE-4 E920
E920
LINE-2 OUT
LINE-3 IN
VIDEO
VIDEO
J960
OUT
IN
PP-15 BOARD (2/2)
(SEE PAGE 4-29)
IC980
VIDEO SELECT
FR-119 BOARD (2/3)
(SEE PAGE 4-33)
PJ400
LINE-2 IN
VIDEO
E820/E870
V IN
V IN
L OUT
R OUT
CN540 (2/2)
LINE-1 (TV)
E820/E870
L
R
J540
AUDIO OUT
(LINE-2)
IC160
IC160 DRUM SERVO
IC160 CAP SERVO
IC160 SYSTEM CONTROL
(SYNCHRO TP) FOLLOW TV
NTSC TV/VTR
S100 (REC REF)
Q101
S SENS
Q100
T SENS
D100
DRUM D/A
DRUM FG
CAP D/A
CAP FG
CTL R/P
CAM LOAD
CAM UNLOAD
MODE 1-4
IC100 (1/2)
DRUM ERROR INTEGRATOR
IC100 (2/2)
CAPSTAN ERROR INTEGRATOR
CAM MOTOR DRIVER
DRUM MOTOR
DRUM FG
CAP MOTOR
IC140
RP-217 BOARD (2/2)
(SEE PAGE 4-7)
CAPSTAN IG AMP
CAP FG
IC140
PRE AMP
IC141
CTL R/P AMP
CTL HEAD
CAM MOTOR
CAM ENCODER
FR-119 BOARD (3/3)
(SEE PAGE 4-33)
IC470
TUNER/TIMER MODE CONTROL
TU DATA/CLOCK/ENABLE
IC472
EEP ROM
SO1/SCLK
SERIAL DATA BUS (S IN/S OUT/SCLK/EDS CS/EDS DAV)
D6V
IC471
POWER FAIL DET/RESET PULSE GENERATOR
POWER CONT/POWER SW
POWER CONT
POWER SW
POWER
S403
POWER
IC400
REMOTE CONTROL RECEIVER
REMOTE CONTROL IN
DATA/S CLK/LED CS/ASURA RESET
SEG1--19/GRID1-6
ND400
FLUORESCENT INDICATOR TUBE
SELECT SWITCH
E870/E920
IC440
LED DRIVER
OPERATING LED
E920
JOG
SELECT SWITCH
DM-62 BOARD
(SEE PAGE 4-33)
CLICK SHUTTLE
E870/E920
OPERATING SWITCH BLOCK
CN540
10
AV-LINC
AV-LINC
E920
J840
LANC
JK-152 BOARD
(SEE PAGE 4-33)
PS-385 BOARD
(SEE PAGE 4-41)
MTR 12V
+12V
D6V
+5V
-30V
SWITCHING REG
LINE FILTER
AC IN
CME
IC800
AL-11 BOARD
(SEE PAGE 4-31)

3-2. VIDEO BLOCK DIAGRAM

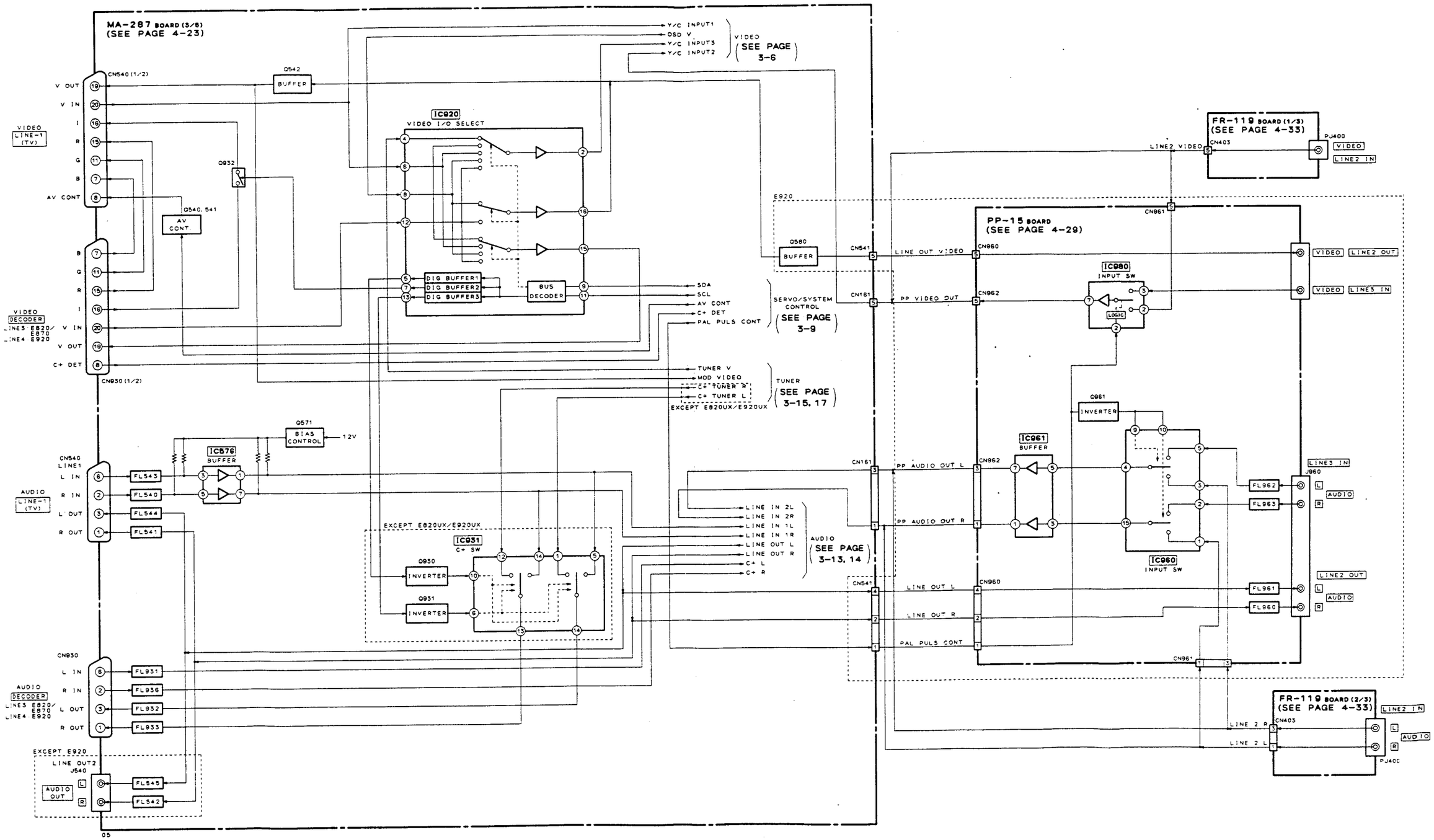


3-3. SERVO/SYSTEM CONTROL BLOCK DIAGRAM

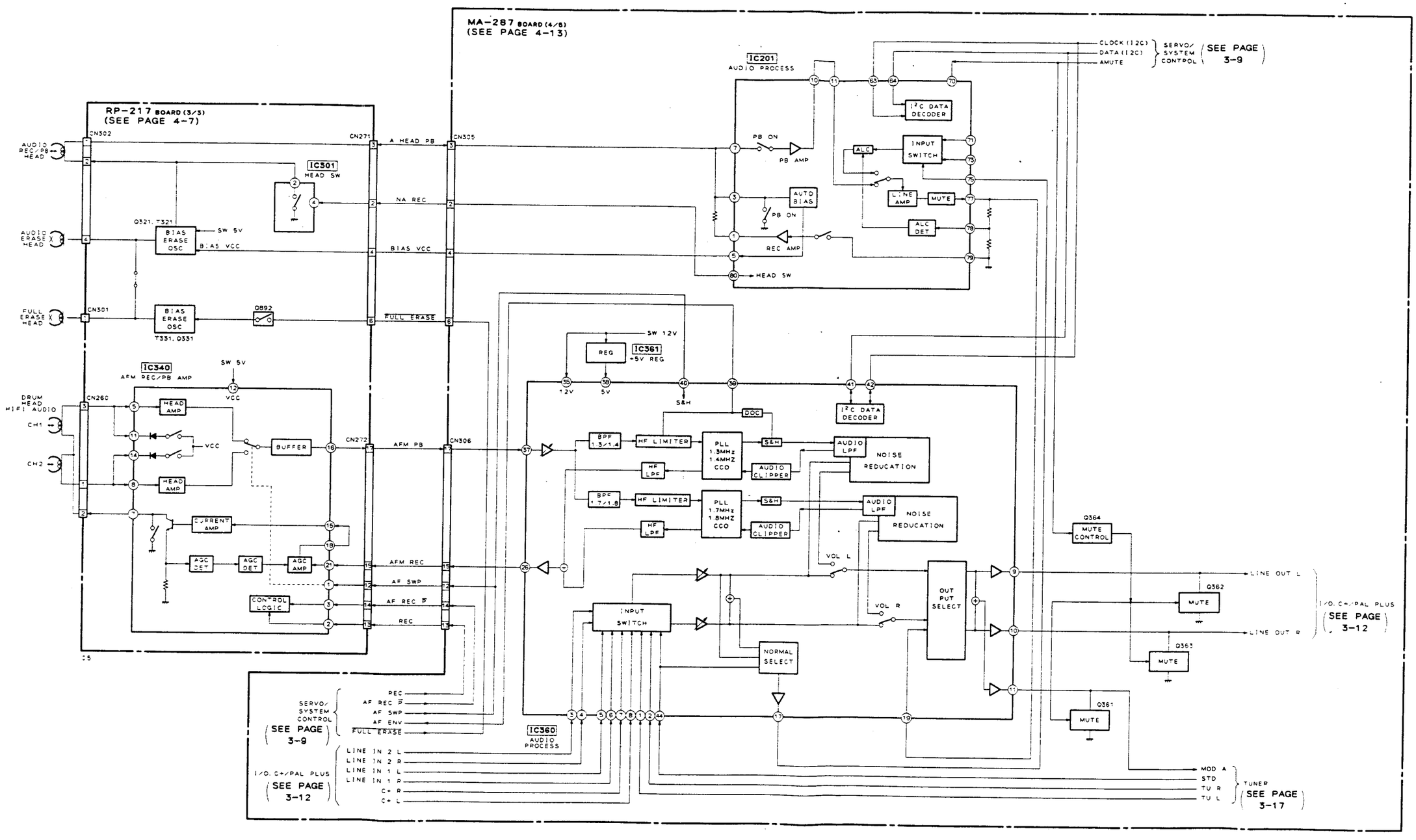



M901
DRUM MOTOR (2/2)
OUTPUT
OUTPUT
MATRIX
HALL DEVAICE
CN101
D VS
MTR 12V
VCC
M902
IC1
CAPSTAN MOTOR (2/2)
CAPSTAN MOTOR
VS
FRC
TL
VM
VCC
U
V
W
U (+)
U (−)
V (+)
V (−)
W (+)
W (−)
AN 5V
HALL DEVICE
CN102
MTR 12V
SW 5V
IC160 REC/PB
3.2 Vp-p (16 MHz)
IC160 REC/PB
4.2 Vp-p (H)
IC160 (2/2)
SYSTEM CONTROL
D 5V
VDD
AVDD
AVREF
XTAL
EXTAL
X160
16MHz
S100
REC PROOF
REC REF
IC130
CAM MOTOR DRIVE
CN104
CAM (−)
CAM (+)
VCC2
VCC1
CAM LOAD
CAM UNLOAD
CAM 1
CAM 2
13V
ROTARY SWITCH
CAM ENCODER
CN103
MODE1
MODE2
MODE3
MODE4
Q102
LED DRIVE
END LED
Q101
TAKE UP END SENSOR
T SENS
TAPE LED D100
Q100
SUPPLY END SENSOR
S SENS
PH101
T REEL FG
T REEL FG
PH100
T REEL FG
S REEL FG
RF ENV
RE SWP
V SYNC
REC
FE ON
QVD
SECAM DET
NT JUDGE
ME SECAM
PAL PLUS CONT
AV CONT
FULL ERS
AF SWP
AF REC P
A MUTE
AF ENV
DATA (SSB)
CLOCK (SSB)
BLUE BACK ON
SCL0
SDA0
ASURA RESET
ASURA CS
SI BUS
SO BUS
SCLK
FOLLOW TV
SW 2
SW 1
TA MUTE
AUTO PRESET
RF ENV
RF SWP
COMP SYNC
REC
FE ON
QVD
SECAM DET
NT JUDGE
ME SECAM
VIDEO
(SEE PAGE 3-5, 6)
PAL PLUS CONT
AV CONT (Q540)
C+ DET
SCLK
SDA
I/O. C+, PAL PLUS
(SEE PAGE 3-12)
DATA (I2C)
CLOCK (I2C)
FULL ERASE
AF SWP
AF REC P
REC
A MUTE
AF ENV
AUDIO
(SEE PAGE 3-13, 14)
DATA (SSB)
CLK (SSB)
Y/C INPUT
H DET
BULE BACK ON
MEDIA VIDEO
SCL (I2C)
SDA (I2C)
VIDEO
(SEE PAGE 3-5, 6)
Q850
BUFFER
CN163
ASURA RESET
ASURA CS
SI
SO
SCLK
H DET
SDA
SCL
C+ DET
PDC DAV
Q401, 402
BUFFER
IC401
FOLLOW TV
IC850
VPS/PDC CONTROL
CV BS SDA
SCL
DAVN
AUTO PRESET
TA MUTE
SW 1
SW 2
TUNER V
AFT
POWER SAVE CONT
SCL
SDA
PLL CLOCK
PLL DATA
TV ENABLE
TUNER
(SEE PAGE 3-17)
MODE CONTROL
(SEE PAGE 3-19)
AFT
POWER SAVE CONT
PLL CLOCK
PLL DATA
TU ENABLE
LANC (E920)
CME CS
IC800
CME
LANC IN
LANC OUT
CS
SI
SO
SCLK
RST
AV LINC IN
AV LINC OUT
Q840, 841
BUFFER
Q800-804
BUFFER
CN800
LANC
CME CS
SI
SO
SCLK
ASURA RESET
AV LINC
CN160
CN540
AV LINC
AL-11 BOARD
(SEE PAGE 4-31)

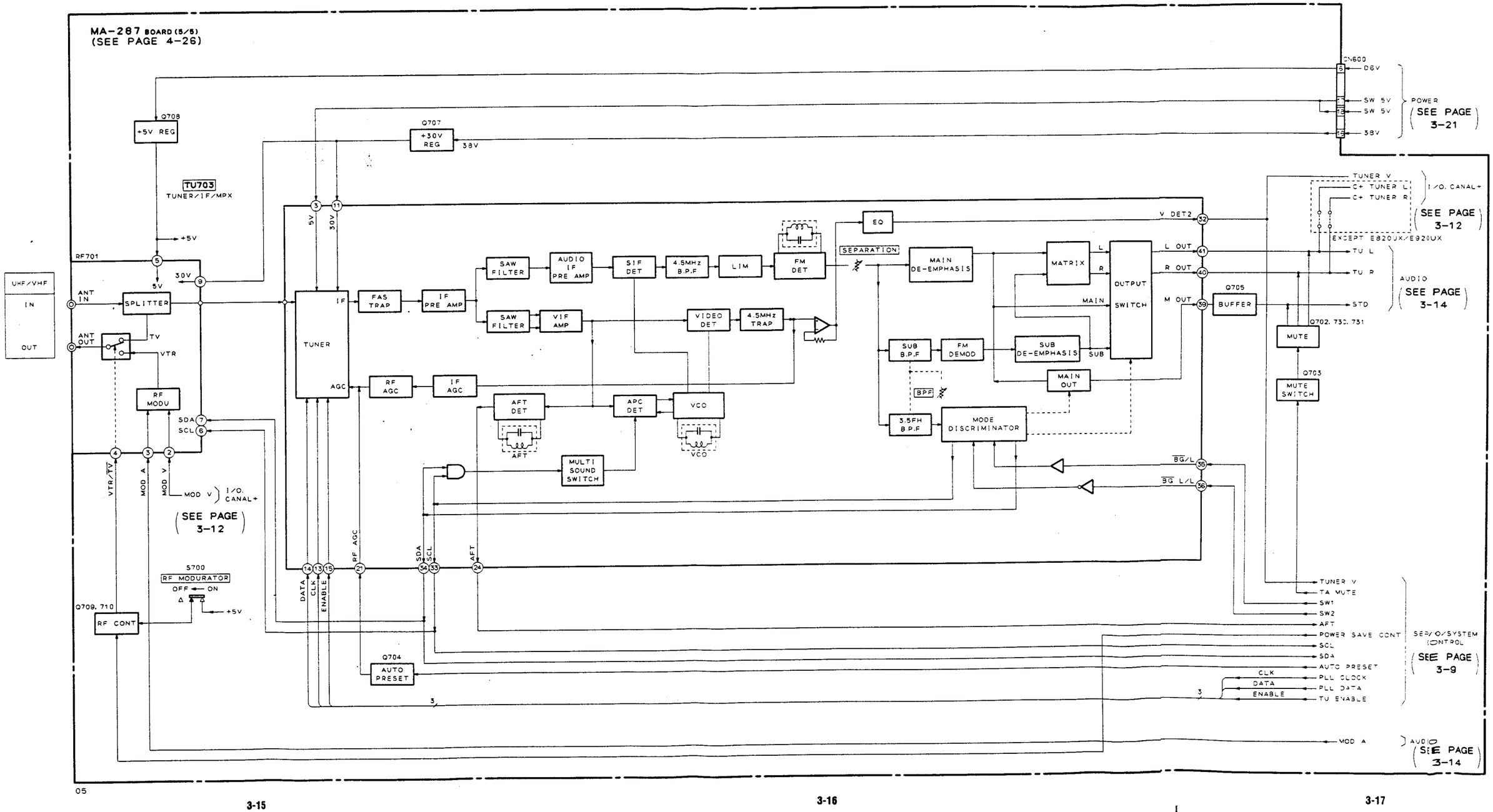
3-4. I/O, C+ /PAL PLUS BLOCK DIAGRAM



3-5. AUDIO BLOCK DIAGRAM

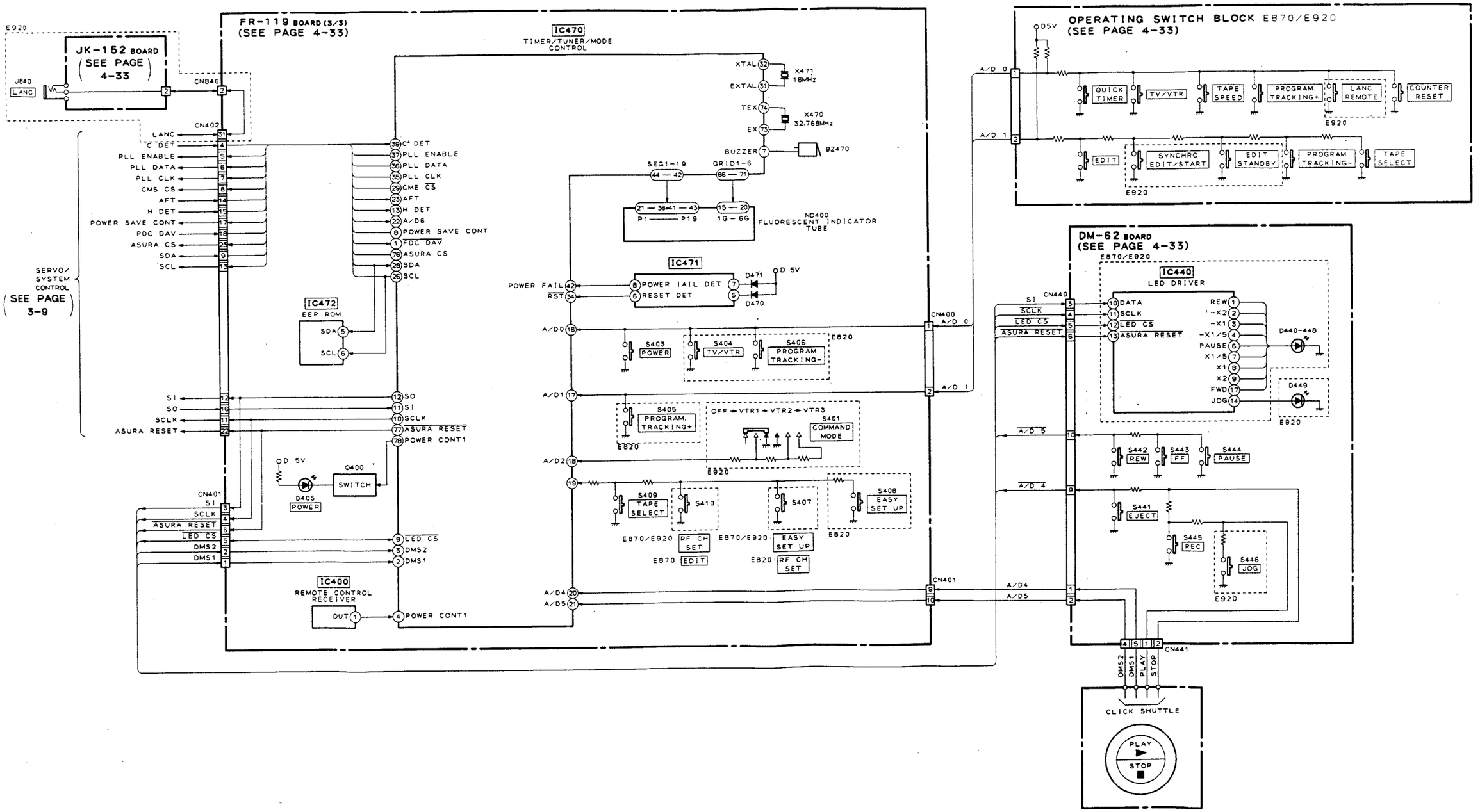


3-6. TUNER BLOCK DIAGRAM

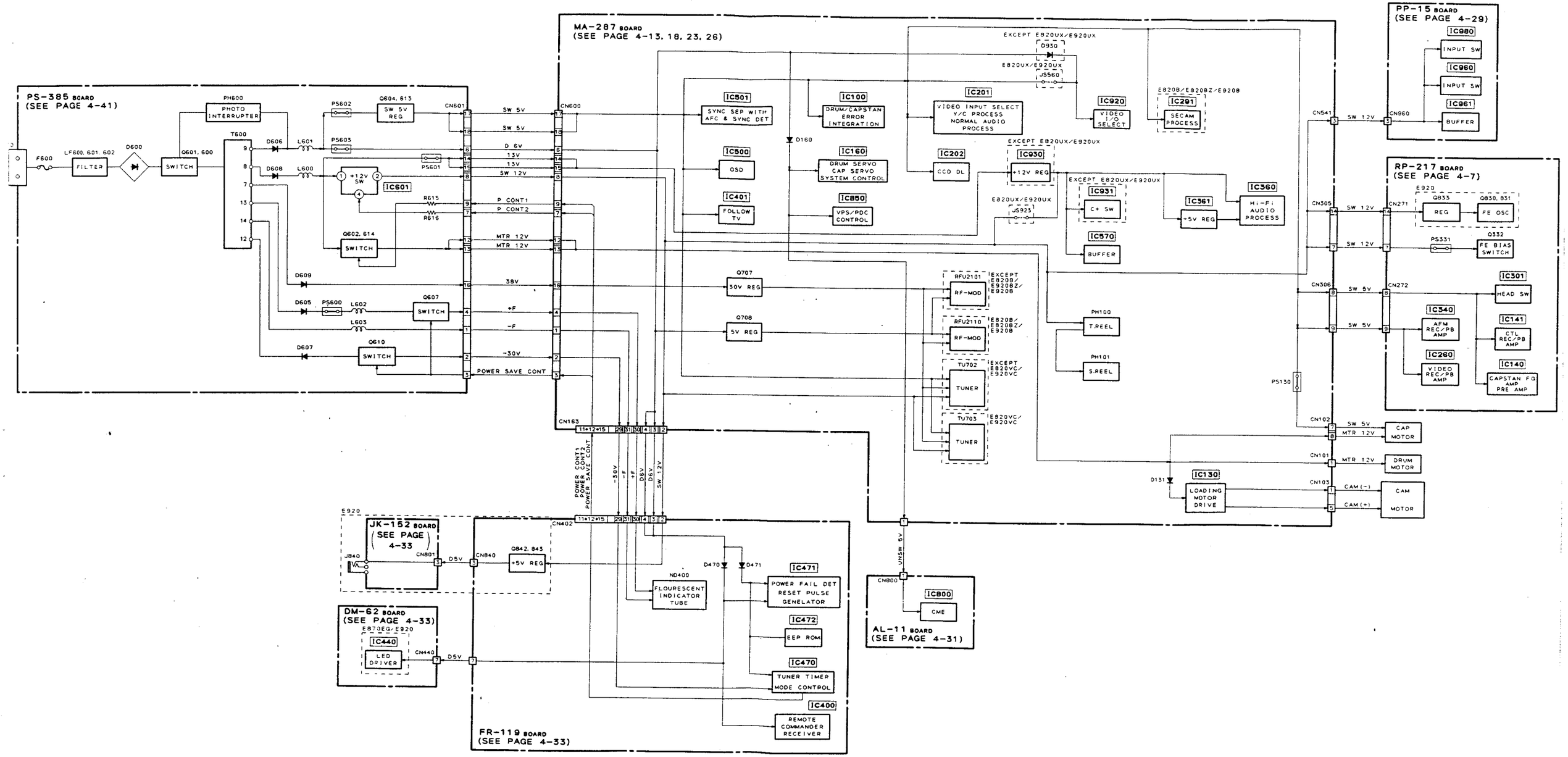


05

3-7. MODE CONTROL BLOCK DIAGRAM



POWER SUPPLY BLOCK DIAGRAM



SECTIONN 4
PRINTED WIRNIG BOARDS
AND
SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary mote is printed in each block.)

For printed wiring boards:

- o—— : indicates a lead wire mounted on the component side.
- •—— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- : Pattern from the side which enables seeing.
- : Pattern on the rear side.*
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

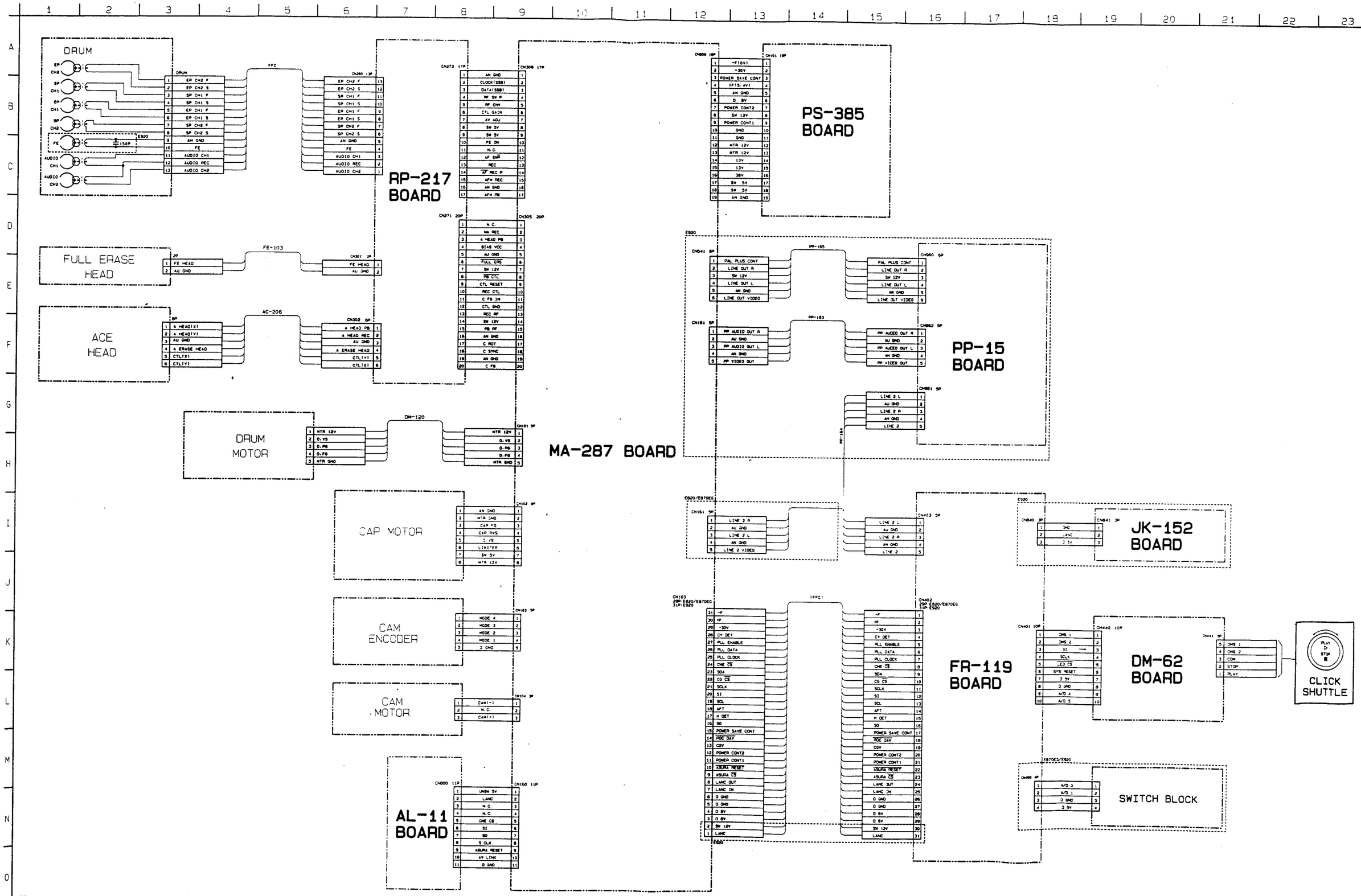
For schematic Diagram:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4 W (Chip resistors : 1/10 W) unless otherwise specified.
  kΩ : 1000Ω, MΩ : 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.*
- : B+ Line.*
- : B– Line.*
- : IN/OUT direction of B line (+, –).*
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC 10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- * : indicated by the color red.


DRUM
FULL ERASE HEAD
ACE HEAD
DRUM MOTOR
CAP MOTOR
CAM ENCODER
CAM MOTOR
RP-217 BOARD
AL-11 BOARD
MA-287 BOARD
PS-385 BOARD
PP-15 BOARD
FR-119 BOARD
JK-152 BOARD
DM-62 BOARD
CLICK SHUTTLE
SWITCH BLOCK

RP-217 (HEAD AMP) PRINTED WIRING BOARD

– Ref. No.: RP-217 board; 1,000 series –

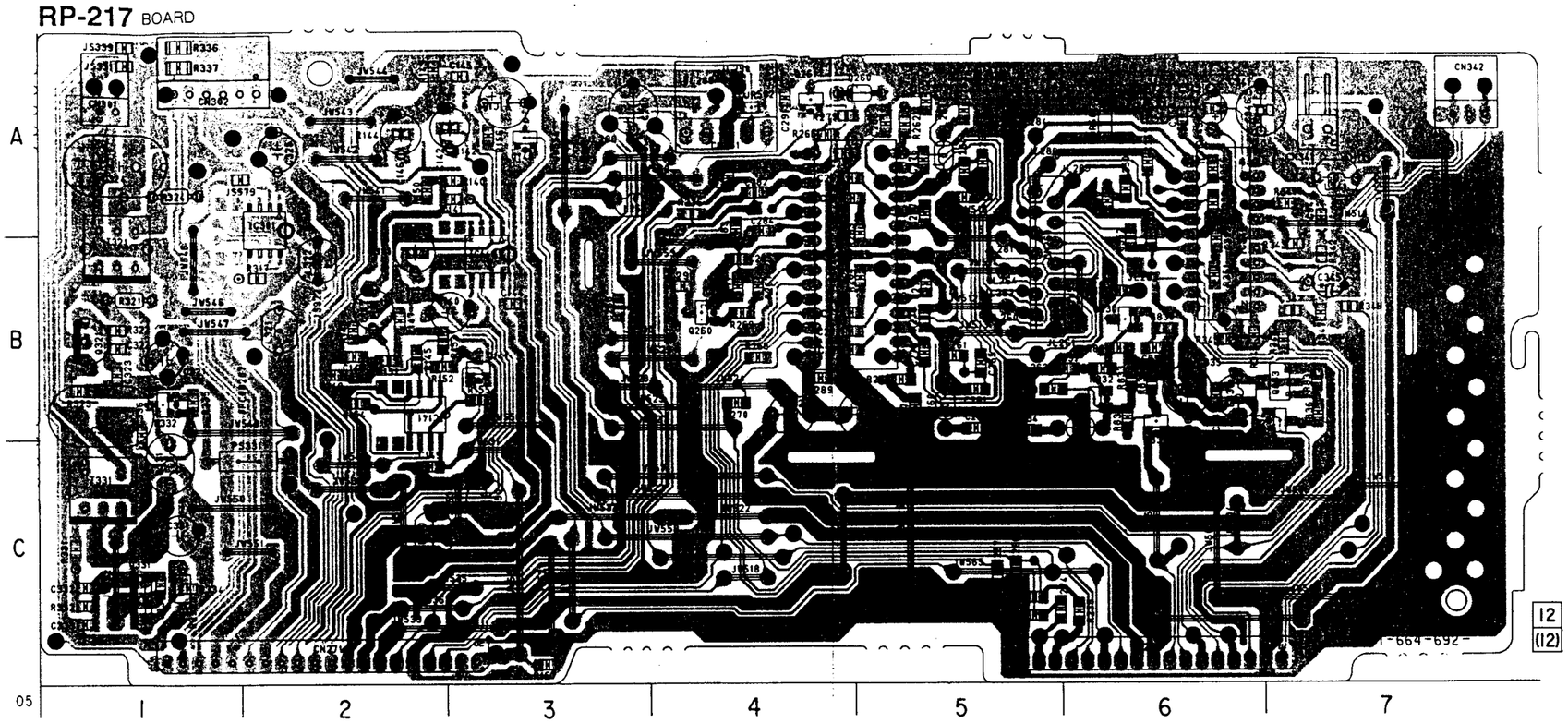
There are few cases that the part isn't mounted in this model is printed on this diagram.

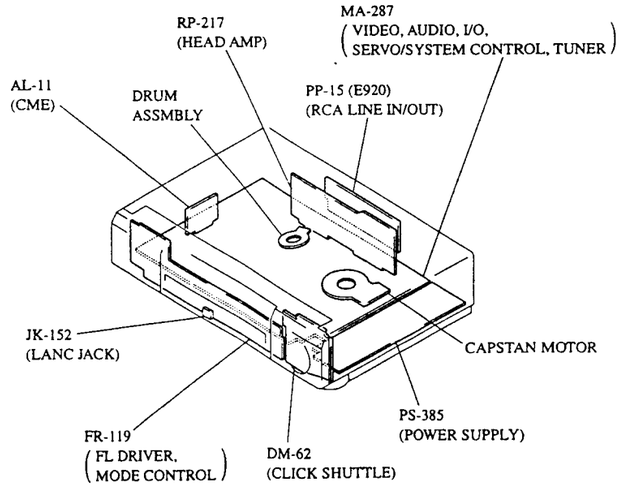
RP-217 BOARD

CN260 B-5
CN261 A-4
CN271 C-2
CN272 C-6
CN301 A-1
CN302 A-1
CN341 A-7

IC140 B-3
IC141 B-2
IC260 B-4
IC301 A-2
IC340 B-6

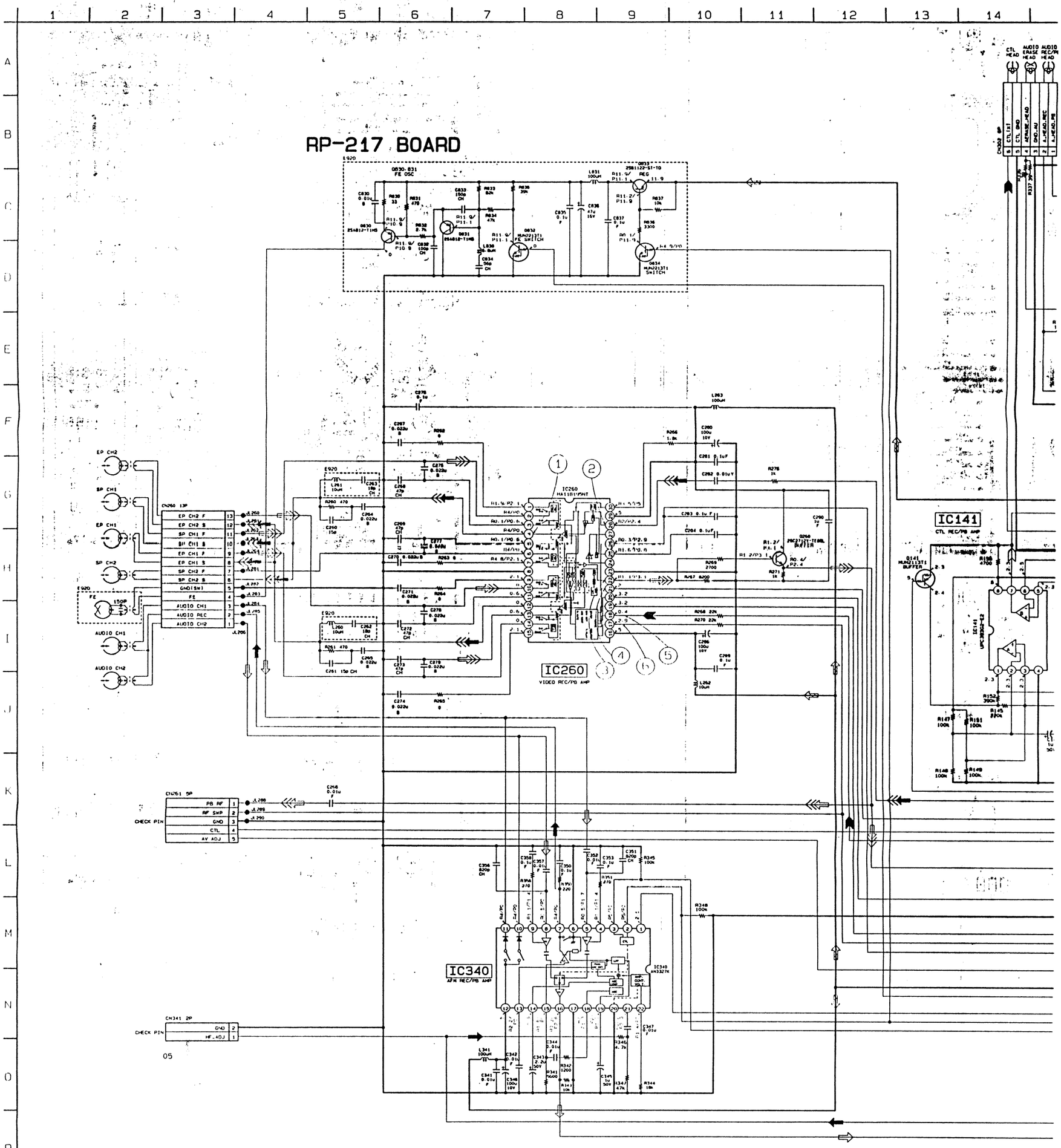
Q141 B-3
Q260 B-4
Q321 B-1
Q331 C-1
Q332 B-1
Q830 B-6
Q831 B-6
Q832 B-6
Q833 B-7
Q834 B-7





RP-217 (HEAD AMP) SCHEMATIC DIAGRAM

– Ref. No.: RP-217 board; 1,000 series –

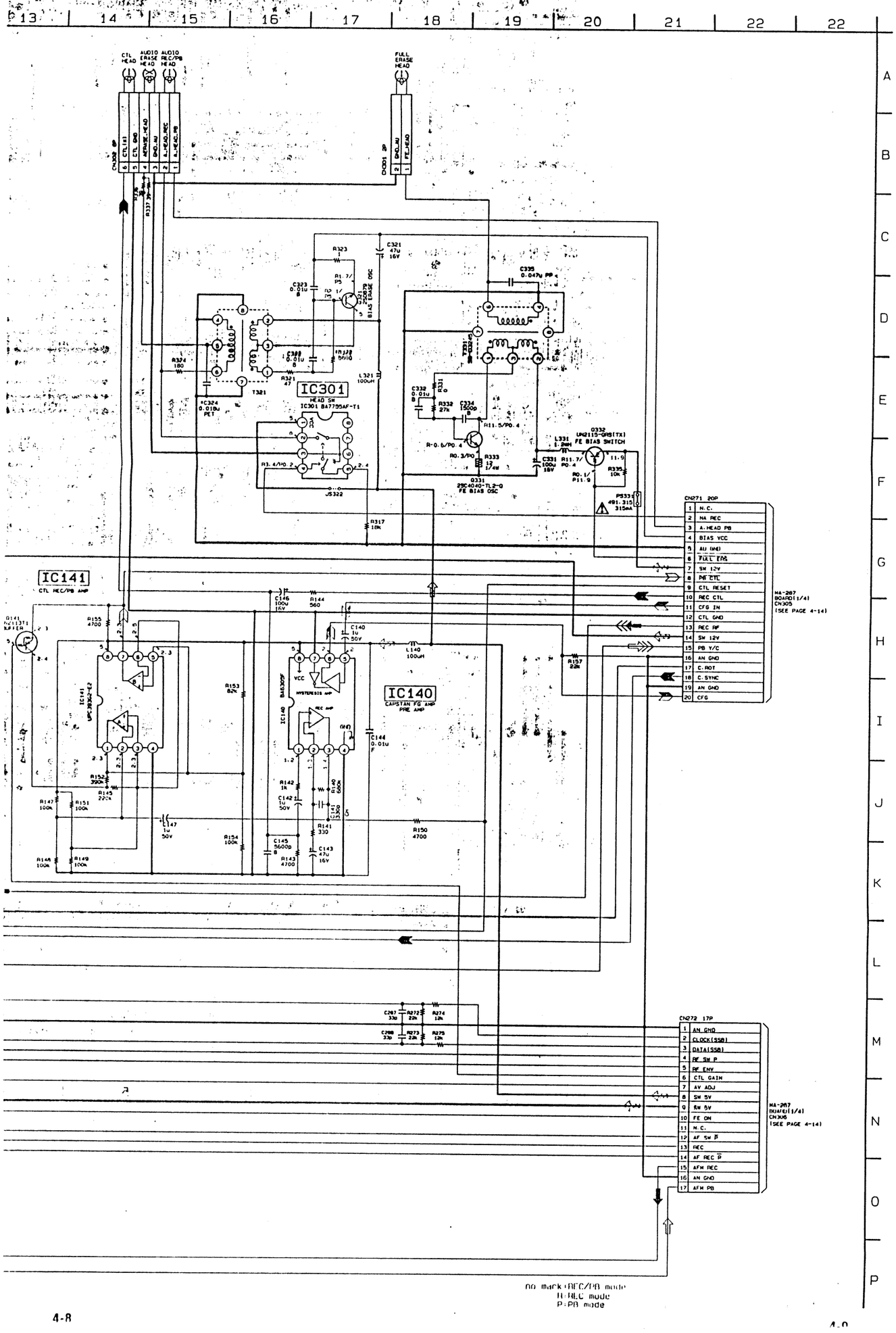


• Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇨	⇨	⇨	⇨

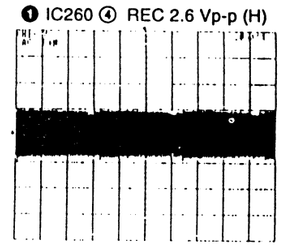
• Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷	
Drum servo (speed and phase)		▷	
Capstan speed servo		▷	
Capstan servo (speed and phase)		▷	
Ref. signal	▷		▷

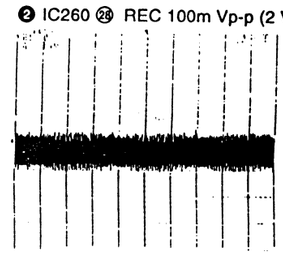


• Waveforms

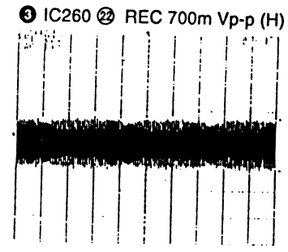
❶ IC260 ④ REC 2.6 Vp-p (H)



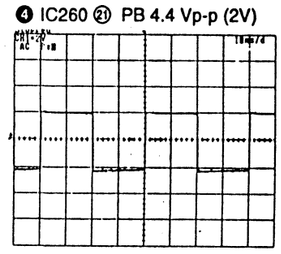
❷ IC260 ㉘ REC 100m Vp-p (2 V)



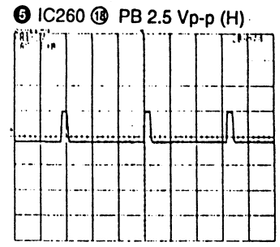
❸ IC260 ㉒ REC 700m Vp-p (H)



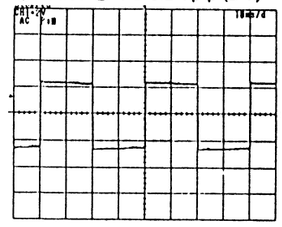
❹ IC260 ㉑ PB 4.4 Vp-p (2V)



❺ IC260 ⑱ PB 2.5 Vp-p (H)



❻ IC260 ⑰ PB 5.2 Vp-p (2 V)



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

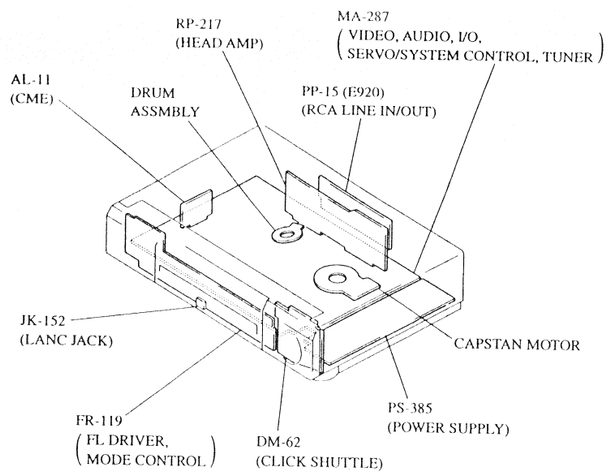
MA-287 BOARD

CN101 B-7
CN102 E-2
CN103 H-2
CN104 I-1
CN160 H-12
CN161 F-11
CN163 I-12
CN164 I-11
CN305 B-4
CN306 B-8
CN540 A-4
CN541 A-2
CN600 G-1
CN930 A-8

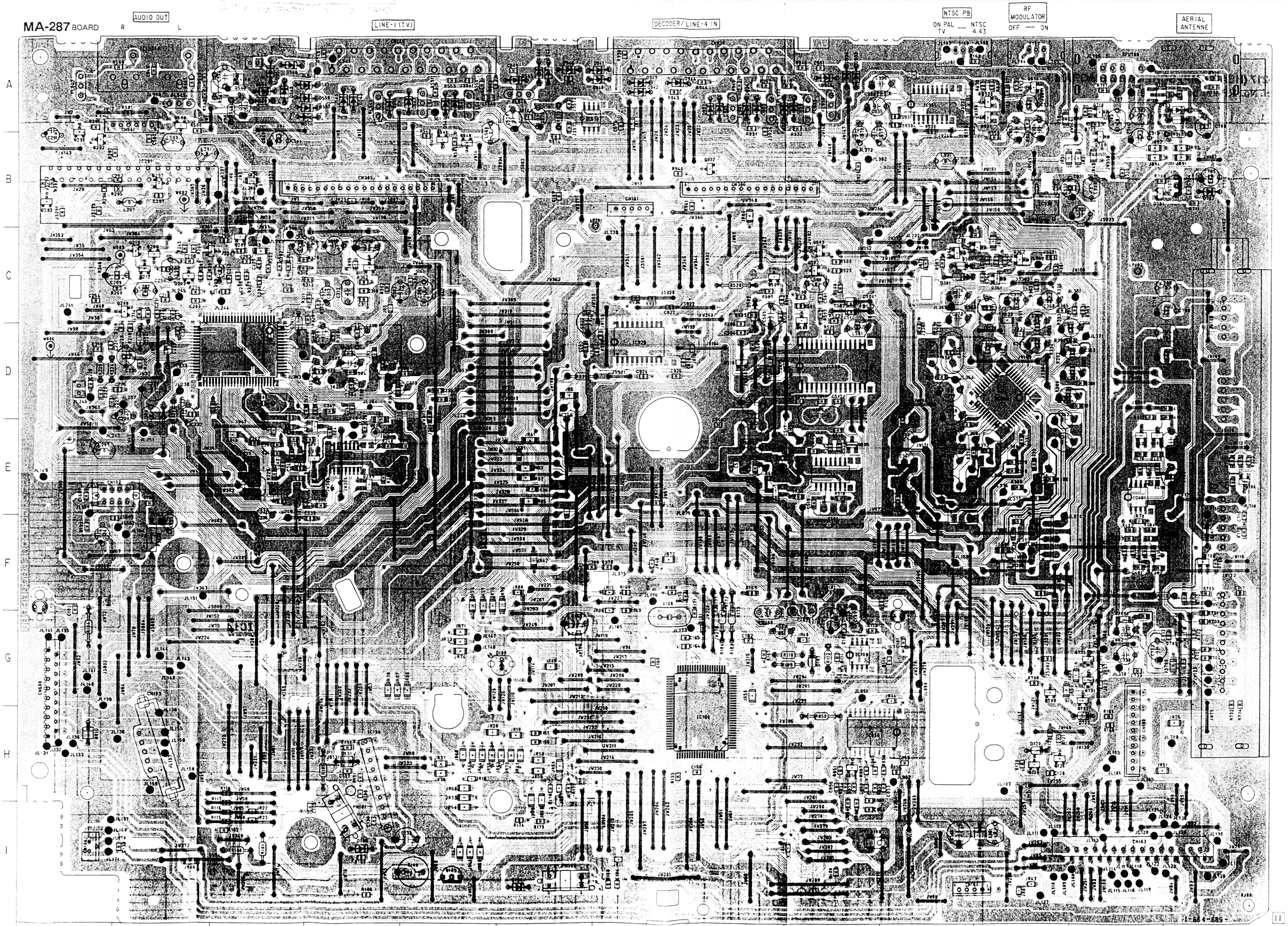
D100 G-6
D107 G-9
D108 H-1
D120 H-11
D131 H-4
D160 I-11
D361 C-10
D502 C-8
D503 C-9
D504 C-9
D540 A-5
D541 A-5
D542 A-6
D543 A-4
D544 A-6
D545 A-4
D546 A-4
D547 A-5
D548 A-3
D549 A-3
D550 A-3
D551 A-3
D552 A-3
D553 A-3
D554 A-3
D555 A-6
D556 A-3
D700 H-12
D701 B-12
D702 B-13
D703 A-13
D704 A-13
D930 F-10
D932 A-8
D933 A-9
D934 A-8
D935 A-8
D936 A-9
D937 A-8
D938 A-9
D939 A-8
D940 A-7
D941 A-7
D942 A-7
D943 A-7
D944 A-7
D946 A-6

IC100 G-9
IC130 H-4
IC160 H-8
IC201 D-3
IC202 E-4
IC291 B-2
IC360 D-11
IC361 D-11
IC401 E-12
IC500 D-9
IC501 E-9
IC570 A-6
IC850 H-9
IC920 D-7
IC930 B-11
IC931 A-10

Q100 G-10
Q101 F-1
Q102 I-5
Q120 H-11
Q121 H-11
Q201 C-3
Q202 C-1
Q205 C-2
Q206 C-2
Q208 C-2
Q209 E-4
Q210 E-4
Q211 E-4
Q291 B-1
Q292 B-1
Q297 B-2
Q301 C-4
Q361 C-11
Q362 C-11
Q363 C-11
Q364 C-10
Q401 E-12
Q402 E-12
Q501 C-9
Q502 C-9
Q503 C-9
Q507 C-8
Q510 D-8
Q540 B-5
Q541 B-5
Q542 A-3
Q571 A-11
Q580 A-2
Q702 G-12
Q703 G-11
Q704 E-13
Q705 G-13
Q707 B-13
Q708 A-12
Q709 B-12
Q710 A-12
Q730 G-12
Q731 G-12
Q850 H-9
Q930 A-11
Q931 A-11
Q932 B-8



MA-287 BOARD

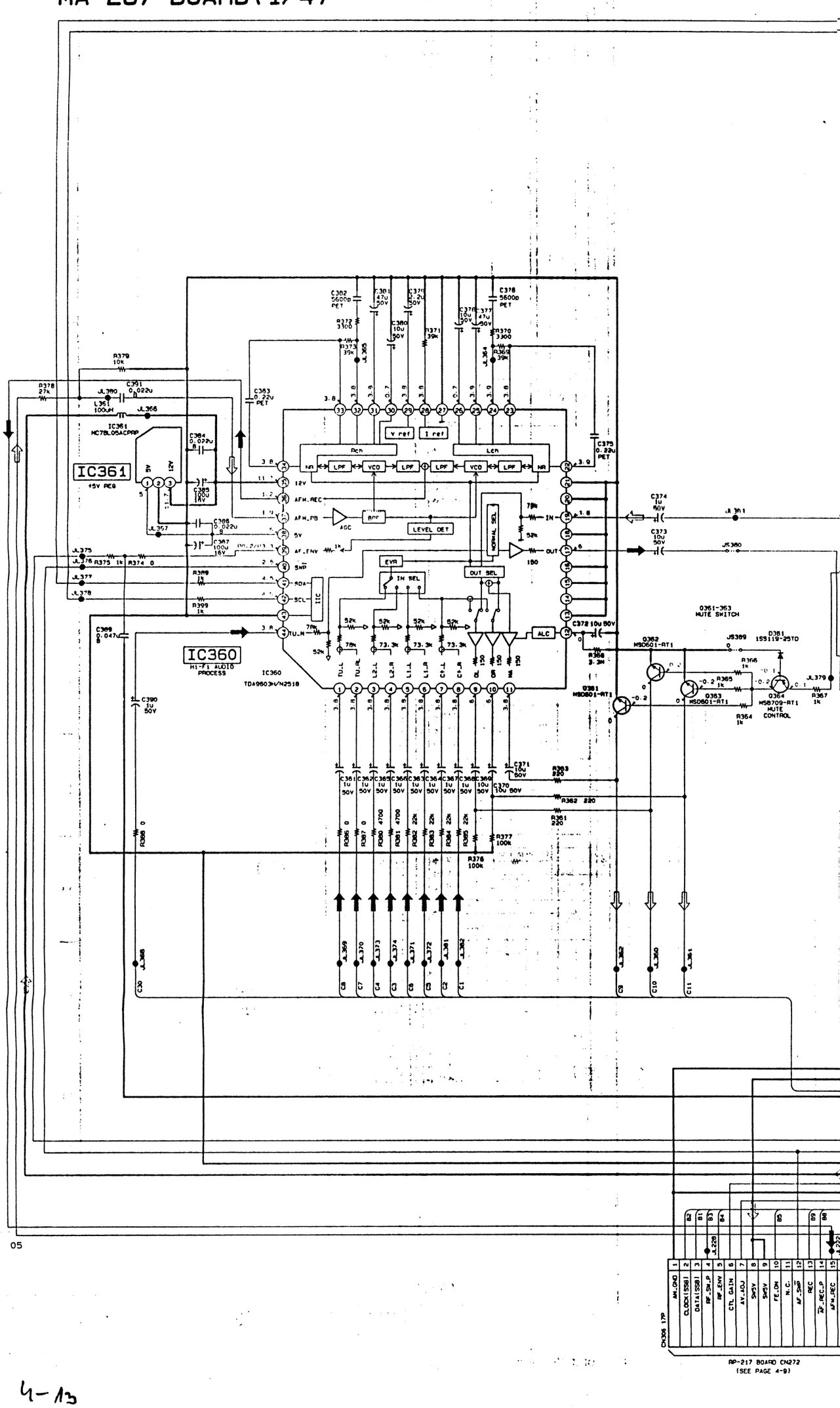


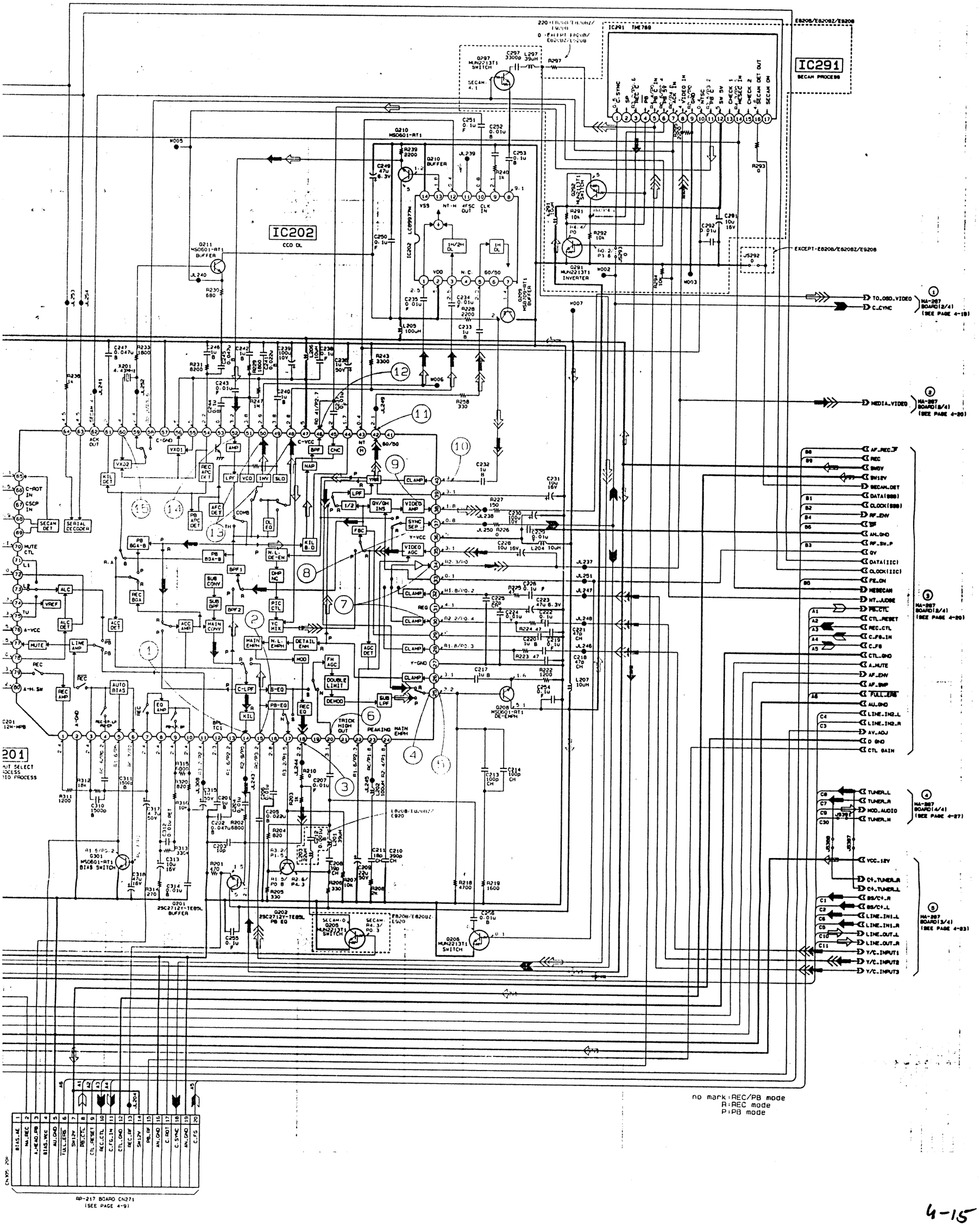
I-664-689-11

MA-287 (VIDEO, AUDIO) SCHEMATIC DIAGRAM

– Ref. No.: MA-287 board; 2,000 series –

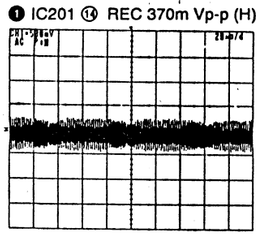
MA-287 BOARD (1/4)



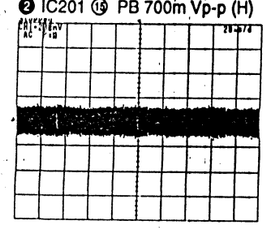

IC291
SECAM PROCESS
IC202
CCD DL
E920B/E920BZ/E920B
EXCEPT:E920B/E920BZ/E920B
TO_OSD_VIDEO
C_CYNC
MEDIA_VIDEO
(1) MA-287 BOARD(2/4) (SEE PAGE 4-19)
(2) MA-287 BOARD(1/4) (SEE PAGE 4-20)
(3) MA-287 BOARD(3/4) (SEE PAGE 4-20)
(4) MA-287 BOARD(4/4) (SEE PAGE 4-87)
(5) MA-287 BOARD(3/4) (SEE PAGE 4-83)
RP-217 BOARD CN271 (SEE PAGE 4-91)
no mark:REC/PB mode
R:REC mode
P:PB mode

• **Waveforms**

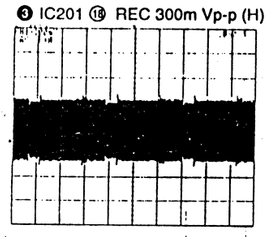
❶ IC201 ⑭ REC 370m Vp-p (H)



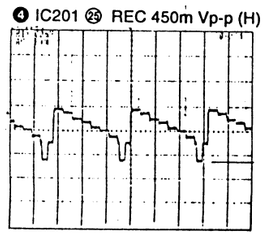
❷ IC201 ⑮ PB 700m Vp-p (H)



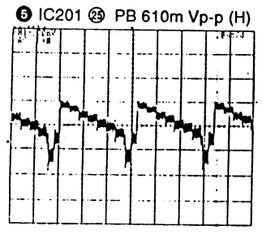
❸ IC201 ⑯ REC 300m Vp-p (H)



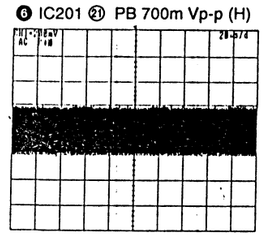
❹ IC201 ㉕ REC 450m Vp-p (H)



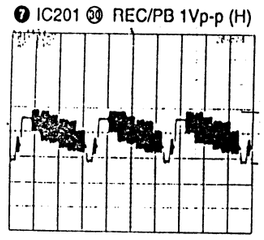
❺ IC201 ㉕ PB 610m Vp-p (H)



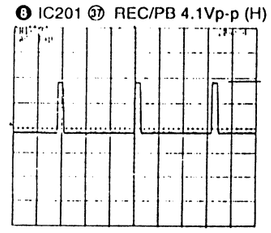
❻ IC201 ㉑ PB 700m Vp-p (H)



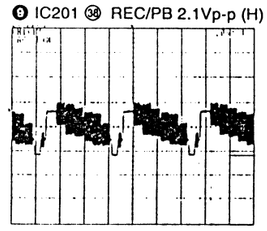
❼ IC201 ㉚ REC/PB 1Vp-p (H)



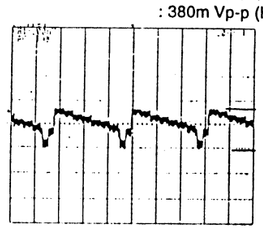
❽ IC201 ㉗ REC/PB 4.1Vp-p (H)



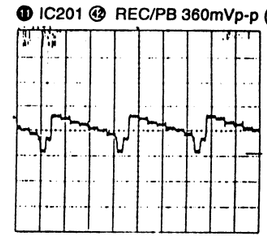
❾ IC201 ㉘ REC/PB 2.1Vp-p (H)



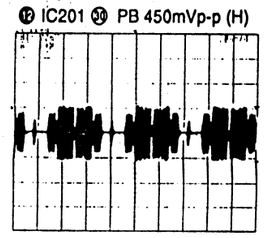
❿ IC201 ㊵ REC : 420m Vp-p (H)
: 380m Vp-p (H)



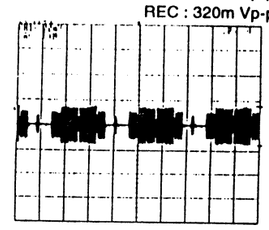
⓫ IC201 ㊷ REC/PB 360mVp-p (H)



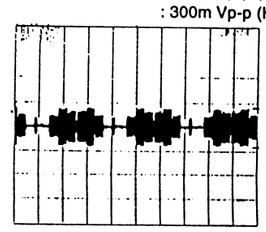
⓬ IC201 ㉚ PB 450mVp-p (H)



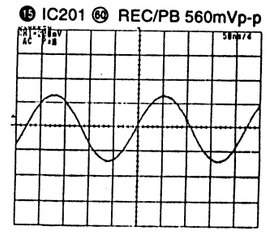
⓭ IC201 ㊽, ㊾ REC : 320m Vp-p (H)
REC : 320m Vp-p (H)



⓮ IC201 ㊷ REC : 430m Vp-p (H)
: 300m Vp-p (H)



⓯ IC201 ㊹ REC/PB 560mVp-p



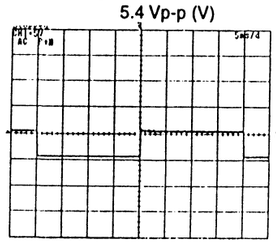
(4.43 MHz)

• Signal path

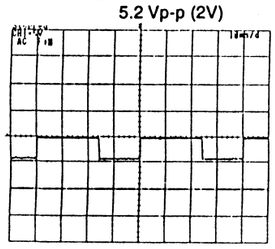
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇨	⇨	⇨	⇨

• Waveforms

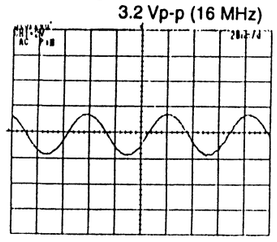
❶ IC160 ① REC/PB
5.4 Vp-p (V)



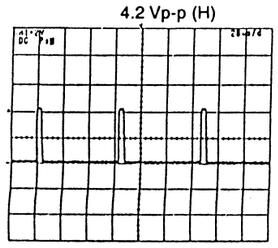
❷ IC160 ⑦ REC
5.2 Vp-p (2V)



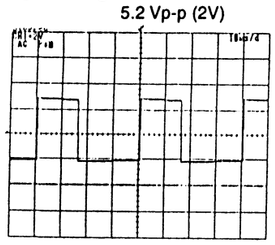
❸ IC160 ㊷ REC/PB
3.2 Vp-p (16 MHz)



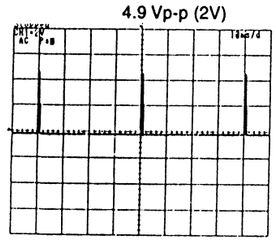
❹ IC160 ㊽ REC/PB
4.2 Vp-p (H)



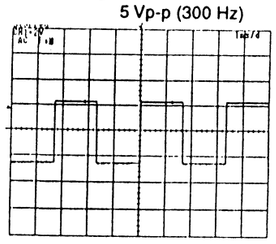
❺ IC160 ㊲ PB
5.2 Vp-p (2V)



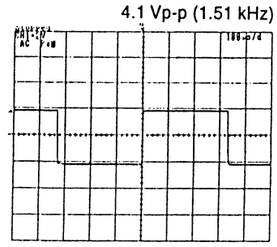
❻ IC160 ㊹ REC/PB
4.9 Vp-p (2V)



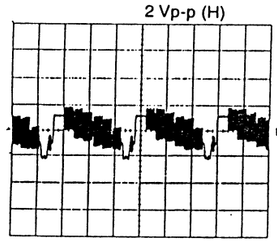
❼ IC160 ㊾ REC/PB
5 Vp-p (300 Hz)



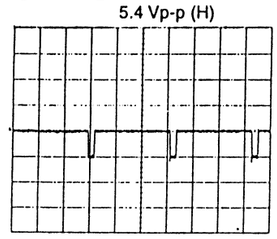
❽ IC160 ⑩ REC/PB
4.1 Vp-p (1.51 kHz)



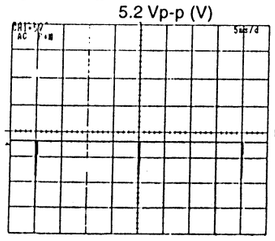
❾ IC500 ③, ㉕ REC/PB
2 Vp-p (H)



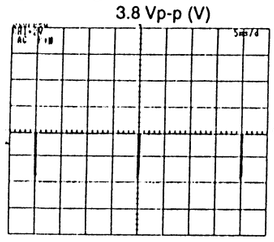
❿ IC500 ⑩ REC/PB
5.4 Vp-p (H)



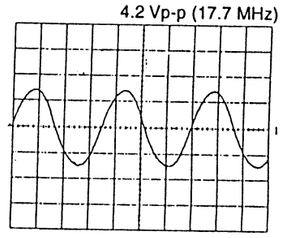
⓫ IC500 ⑪ REC/PB
5.2 Vp-p (V)



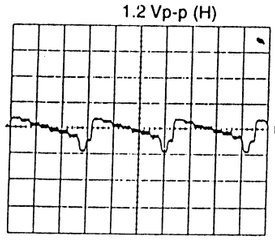
⓬ IC500 ⑬ REC/PB
3.8 Vp-p (V)



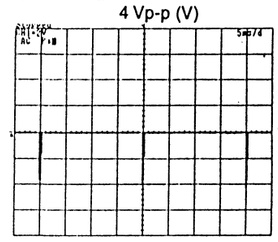
⓭ IC500 ⑧ REC/PB
4.2 Vp-p (17.7 MHz)



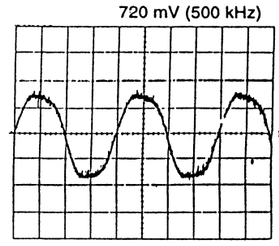
⓮ IC501 ② REC/PB
1.2 Vp-p (H)



❿ IC501 ⑤ REC/PB
4 Vp-p (V)

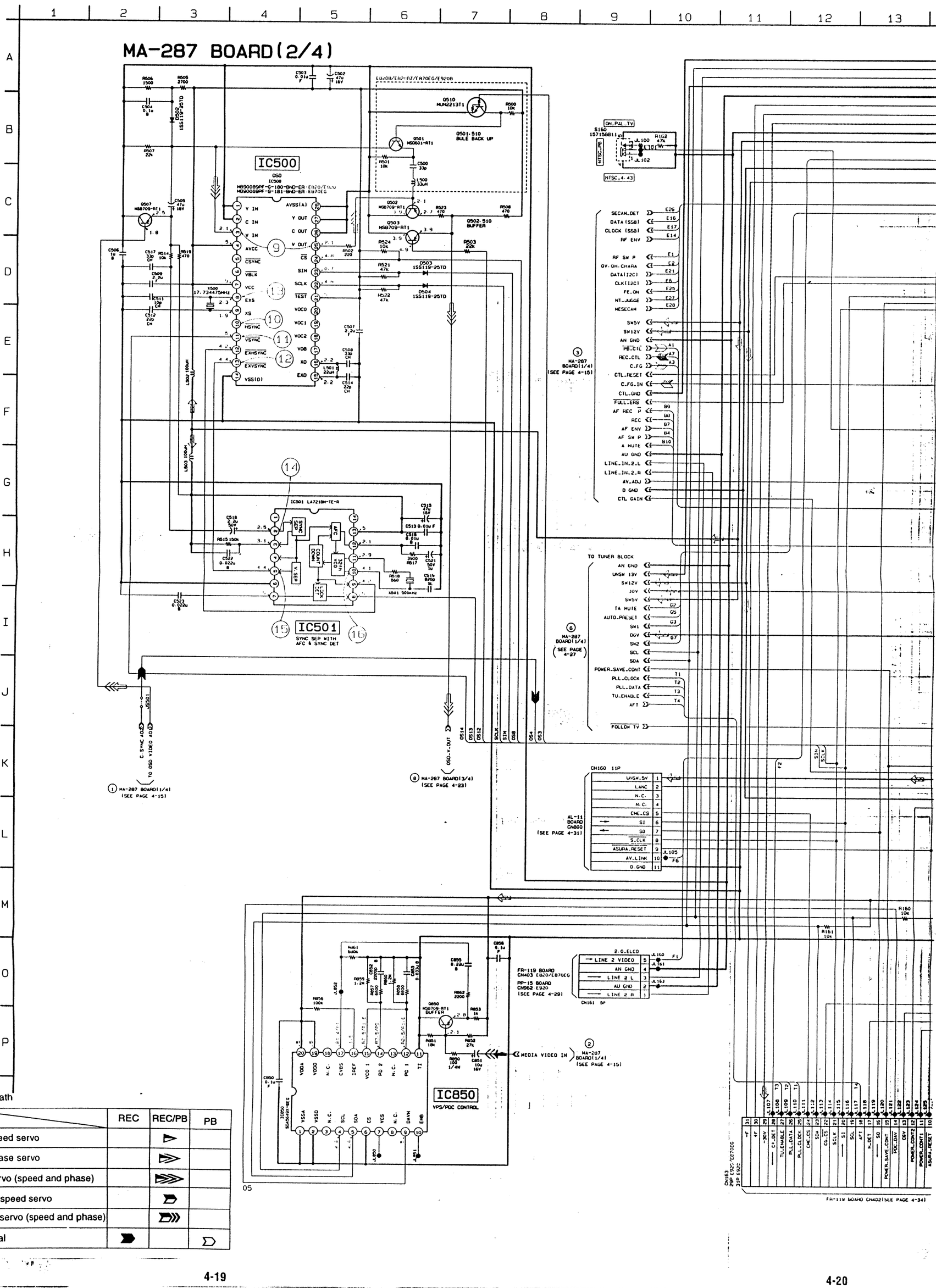


⓰ IC501 ⑩ REC/PB
720 mV (500 kHz)



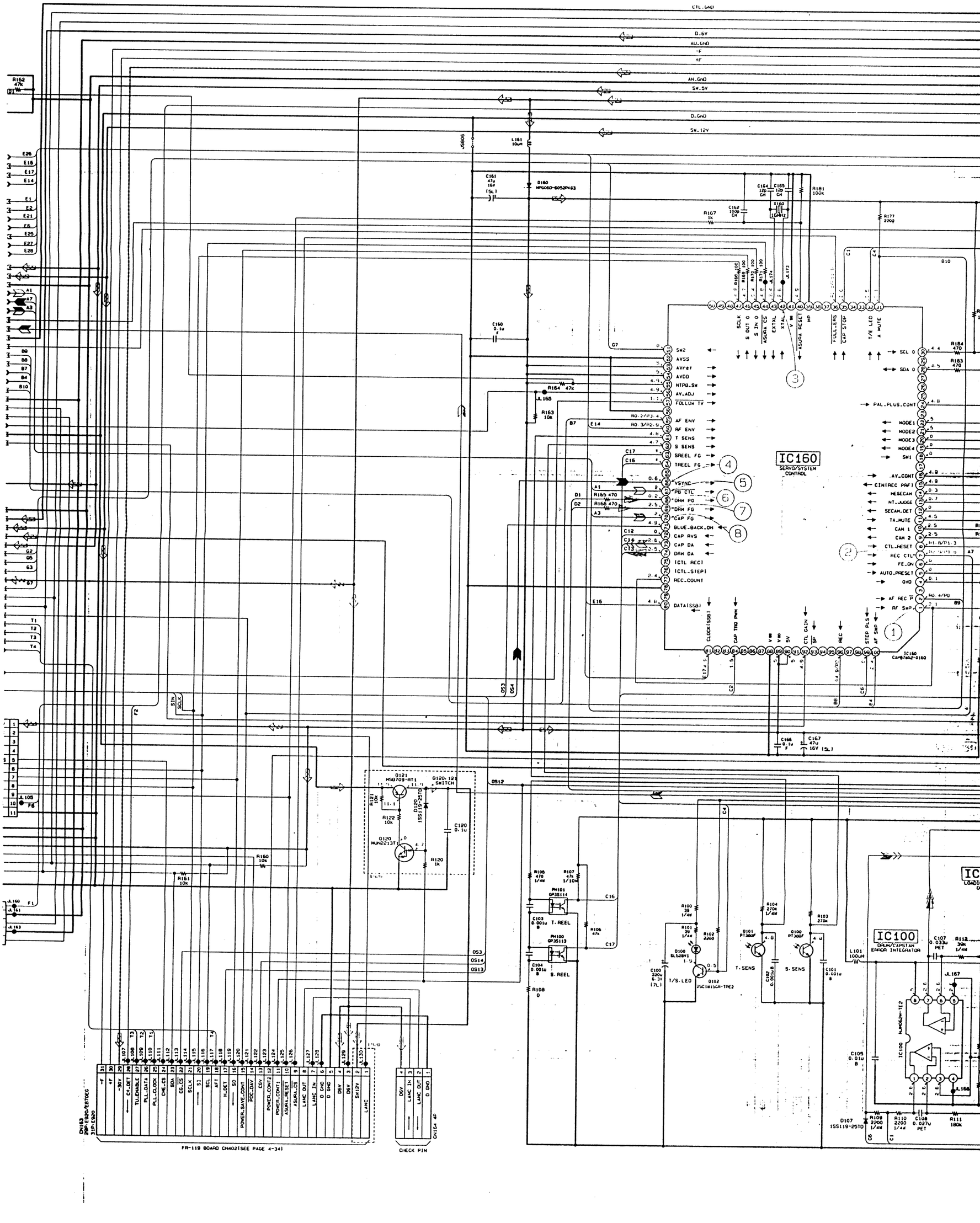
MA-287 (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM • **See page 4-10 to 4-12 for printed wiring board.**

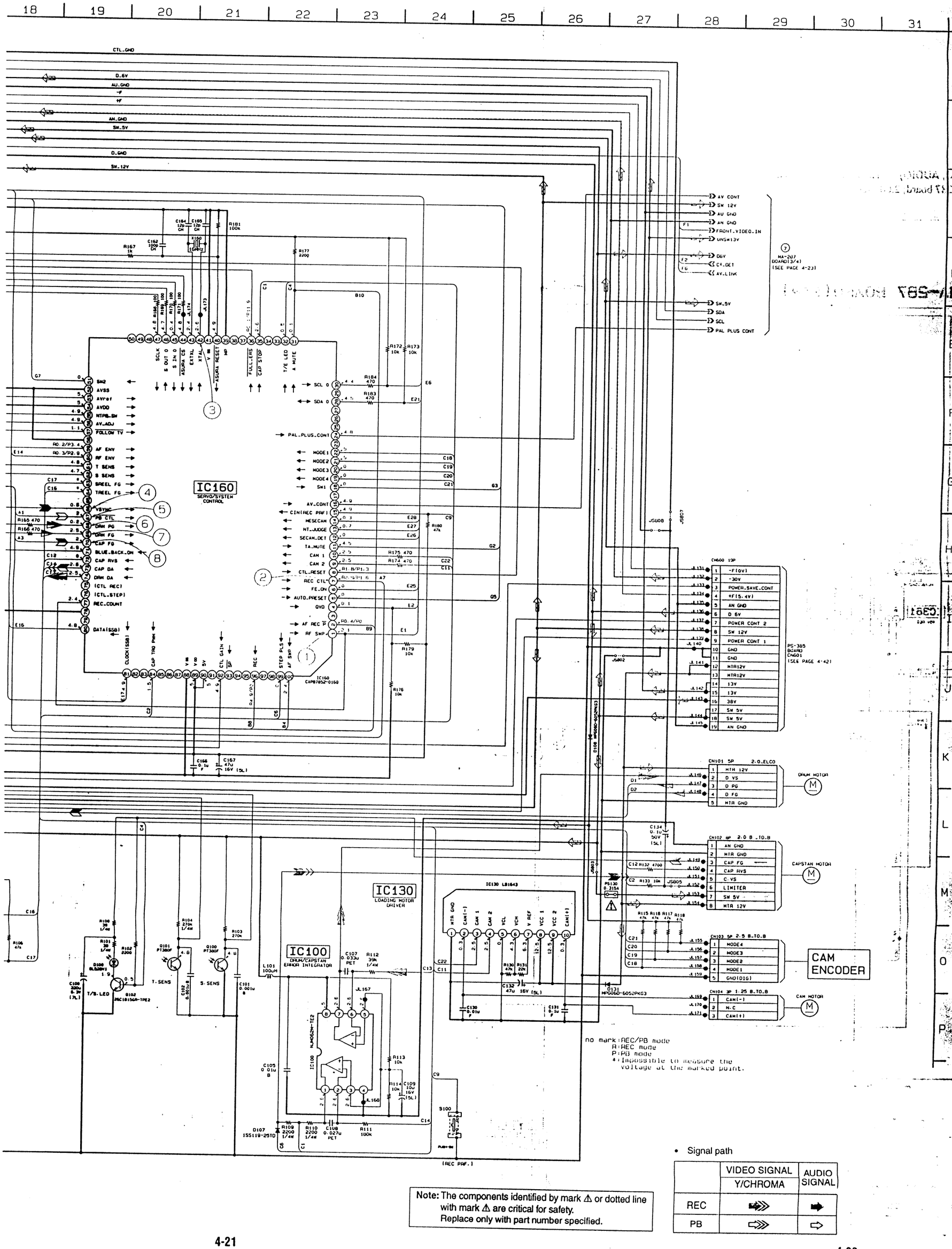
– Ref. No.: MA-287 board; 2,000 series –



- Signal path

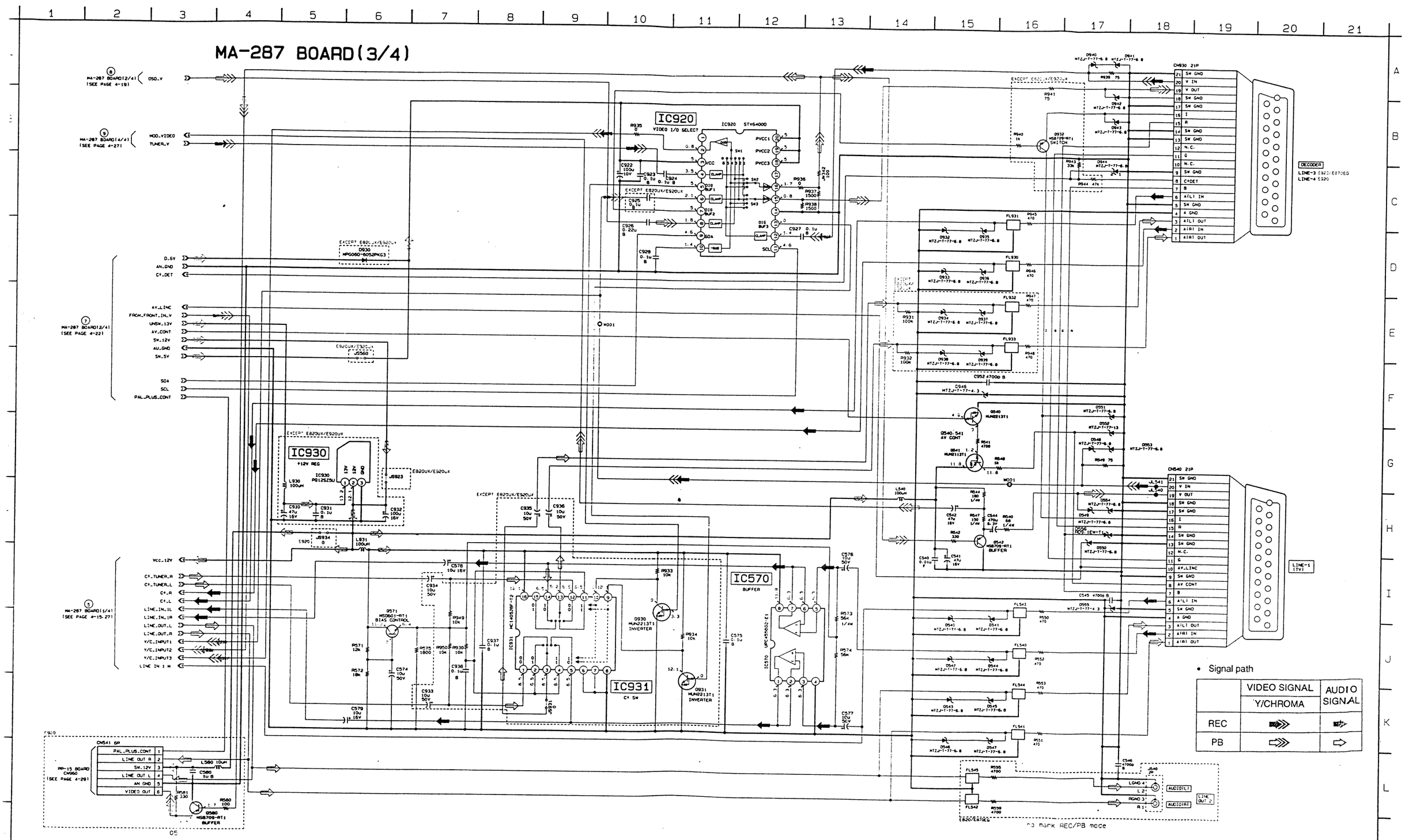
	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷▷	
Drum servo (speed and phase)		▷▷▷	
Capstan speed servo		▷	
Capstan servo (speed and phase)		▷▷▷	
Ref. signal	▶		▷


IC160
SERVO/SYSTEM CONTROL
IC100
DRUM/CAPSTAN ERROR INTEGRATOR
CTL_GND
D_6V
AU_GND
-F
+F
AN_GND
SW_5V
D_GND
SW_12V
SW2
AVSS
AVref
AVDD
NTPB_SW
AV_ADJ
FOLLOW TV
AF ENV
RF ENV
T SENS
S SENS
SREEL FG
TREEL FG
VSYNC
PB CTL
*DRM PG
*DRM FG
*CAP FG
BLUE_BACK_ON
CAP RVS
CAP DA
DRM DA
(CTL REC)
(CTL_STEP)
REC_COUNT
DATA(SSB)
CLOCK(SSB)
CAP TRG PWM
CTL GAIN
REC
STEP PLS
AF SHP
SCL 0
SDA 0
PAL_PLUS_CONT
MODE1
MODE2
MODE3
MODE4
SW1
AV_CONT
CINEREC PREF
MESECAM
NT_JUDGE
SECAM_DET
TA_MUTE
CAM 1
CAM 2
CTL_RESET
REC CTL
FE_ON
AUTO_PRESET
GVD
AF REC
AF SWP
SCLK
S OUT 0
S IN 0
ASURA CS
EXTXL
XTAL
ASURA RESET
MD
FULL_EFS
CAP STOP
T/E LED
A MUTE
T. REEL
S. REEL
T/S. LED
T. SENS
S. SENS
CN153
29P:E820/E870EG
31P:E820
CN164 4P
CHECK PIN
FR-119 BOARD CN402(SEE PAGE 4-341


IC160
SERVO/SYSTEM CONTROL
IC130
LOADING MOTOR DRIVER
IC100
DRUM/CAPSTAN ERROR INTEGRATOR
IC130 LB1643
CAM ENCODER
DRUM MOTOR
CAPSTAN MOTOR
CAM MOTOR
CN600 19P
CN101 5P 2.0_ELCO
CN102 8P 2.0 B_TO_B
CN103 5P 2.5 B_TO_B
CN104 3P 1.25 B_TO_B
CTL_GND
D_5V
AU_GND
AN_GND
SW_5V
D_GND
SW_12V
AV CONT
SW 12V
AU GND
AN GND
FRONT_VIDEO_IN
UNSW13V
D6V
C1_DET
AV_LINK
SW_5V
SDA
SCL
PAL PLUS CONT
MA-207 BOARD(3/4) (SEE PAGE 4-23)
PS-385 BOARD CN601 (SEE PAGE 4-42)
SCL 0
SDA 0
PAL_PLUS_CONT
MODE1
MODE2
MODE3
MODE4
SW1
AV_CONT
CIN(REC PRF)
MESECAM
NT_JUDGE
SECAM_DET
TA_MUTE
CAM 1
CAM 2
CTL_RESET
REC CTL
FE_ON
AUTO_PRESET
QVD
AF REC P
AF SMP
DATA(SSB)
CLOCK(SSB)
CAP TRG PWM
REC_COUNT
(CTL REC)
(CTL_STEP)
BLUE_BACK_ON
CAP RVS
CAP DA
DRM DA
DRM FG
DRM PG
CAP FG
VSYNC
PB CTL
TREEL FG
SREEL FG
T SENS
S SENS
AF ENV
RF ENV
NTPB_SW
AV_ADJ
FOLLOW TV
AVSS
AVref
AVDD
T/B.LED
(REC PRF.)
no mark:REC/PB mode
R:REC mode
P:PB mode
4:Impossible to measure the voltage at the marked point.
Signal path
VIDEO SIGNAL
Y/CHROMA
AUDIO SIGNAL
REC
PB
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

MA-287 (IN/OUT) SCHEMATIC DIAGRAM • **See page 4-10 to 4-12 for printed wiring board.**

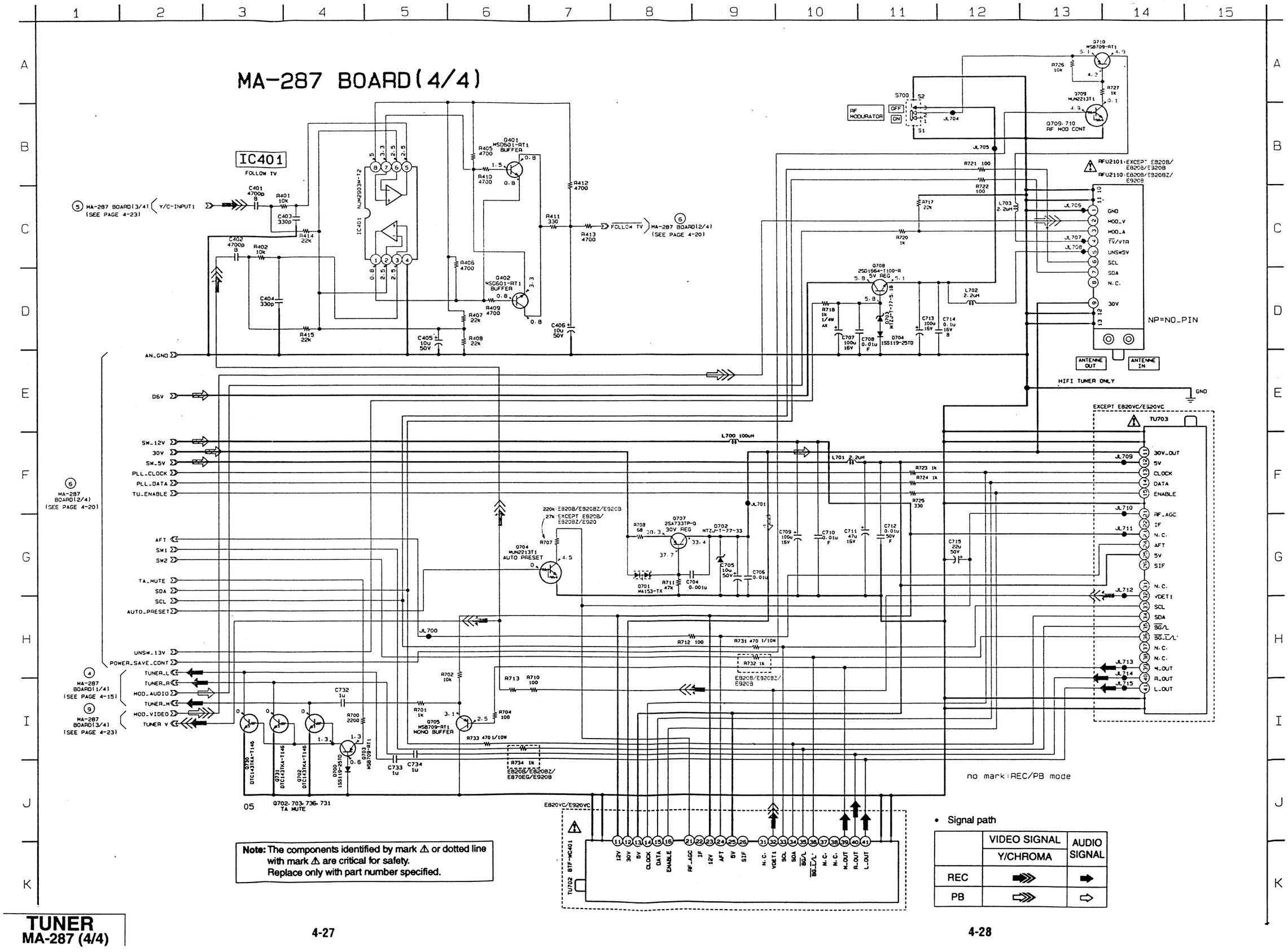
– Ref. No.: MA-287 board; 2,000 series –



MA-287 (TUNER) SCHEMATIC DIAGRAM • **See page 4-10 to 4-12 for printed wiring board.**

– Ref. No.: MA-287 board; 2,000 series –

MA-287 BOARD(4/4)

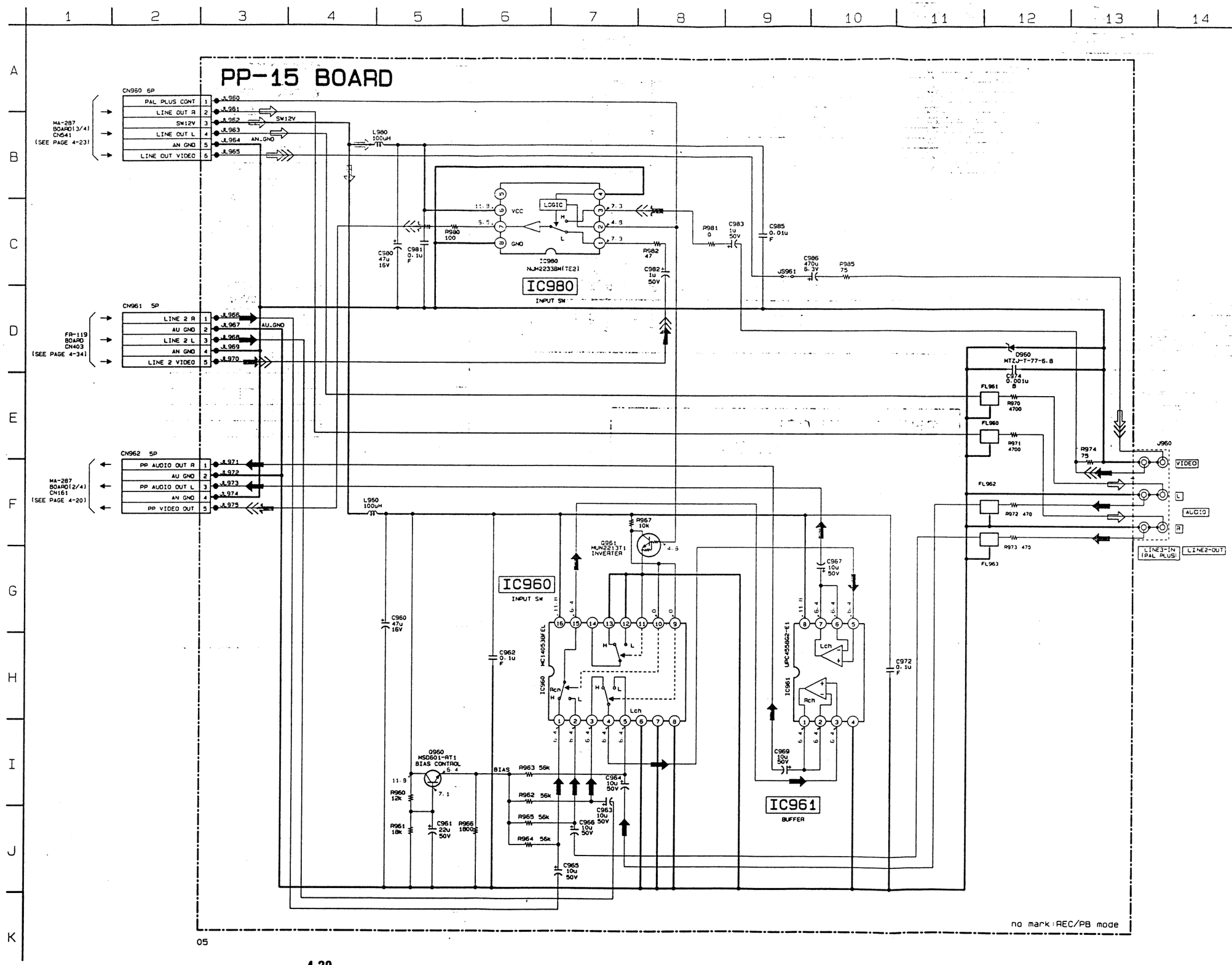


Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

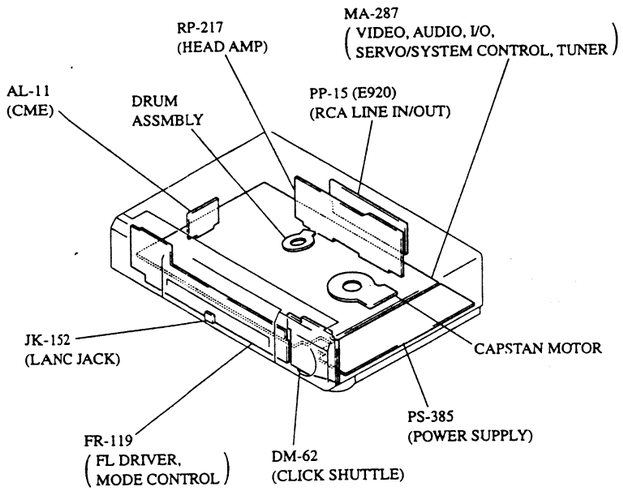
• Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	➡	➡
PB	⇨	⇨

PP-15 BOARD



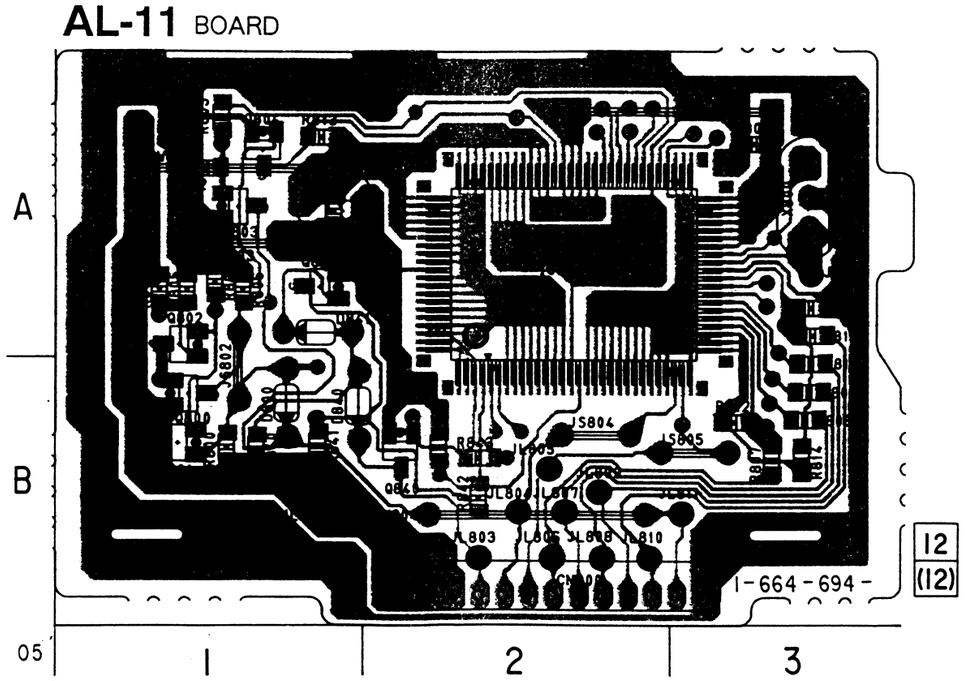
05



ew cases that the part isn't mounted in this model is printed on this diagram.

AL-11 (CME) PRINTED WIRING BOARD SCHEMATIC DIAGRAM

– Ref. No.: AL-11 board; 1,000 series –



AL-11 BOARD

CN800 B-2

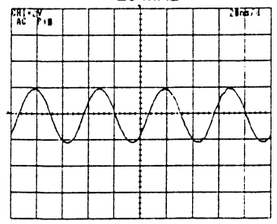
D800 B-1
D840 B-1
D841 A-1

IC800 A-2

Q800 B-1
Q801 B-1
Q802 A-1
Q803 A-1
Q804 A-1
Q840 B-2
Q841 A-1

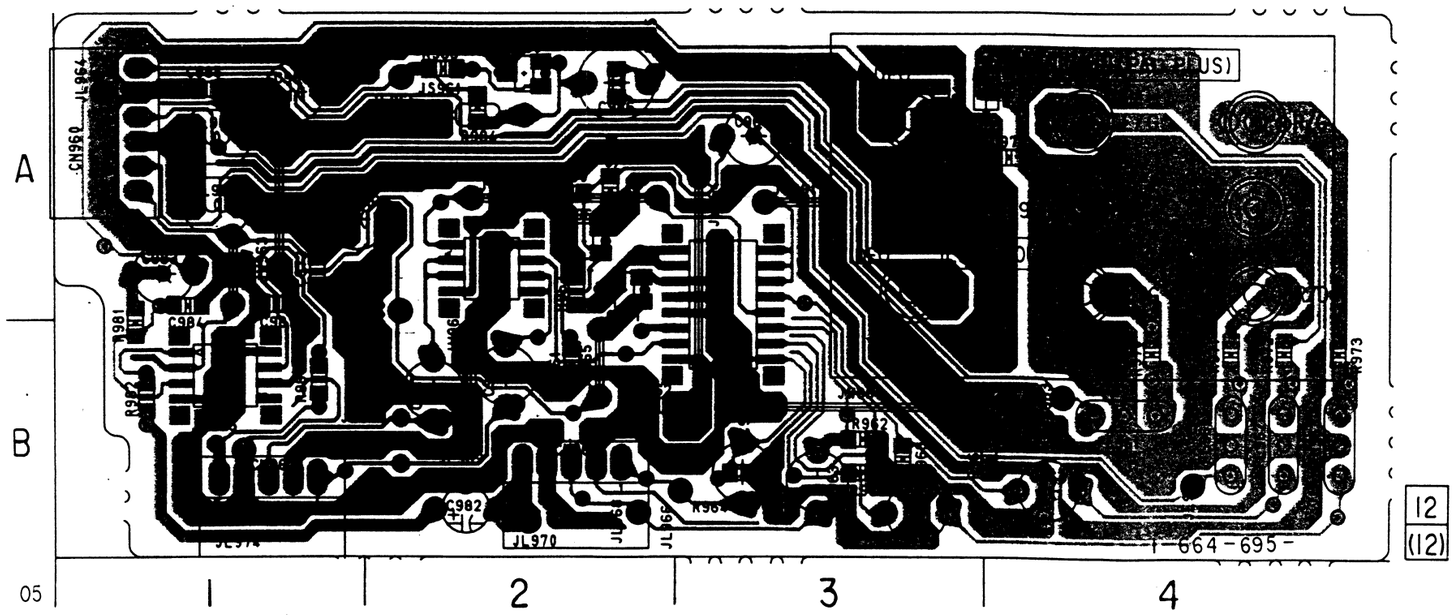
• Waveform

❶ IC800 ㊷ 4.16 Vp-p
20 MHz



PP-15 (REC LINE IN/OUT) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM
– Ref. No.: PP-15 board; 1,000 series –

PP-15 BOARD



PP-15 BOARD

CN960 A-1
CN961 B-2
CN962 B-1

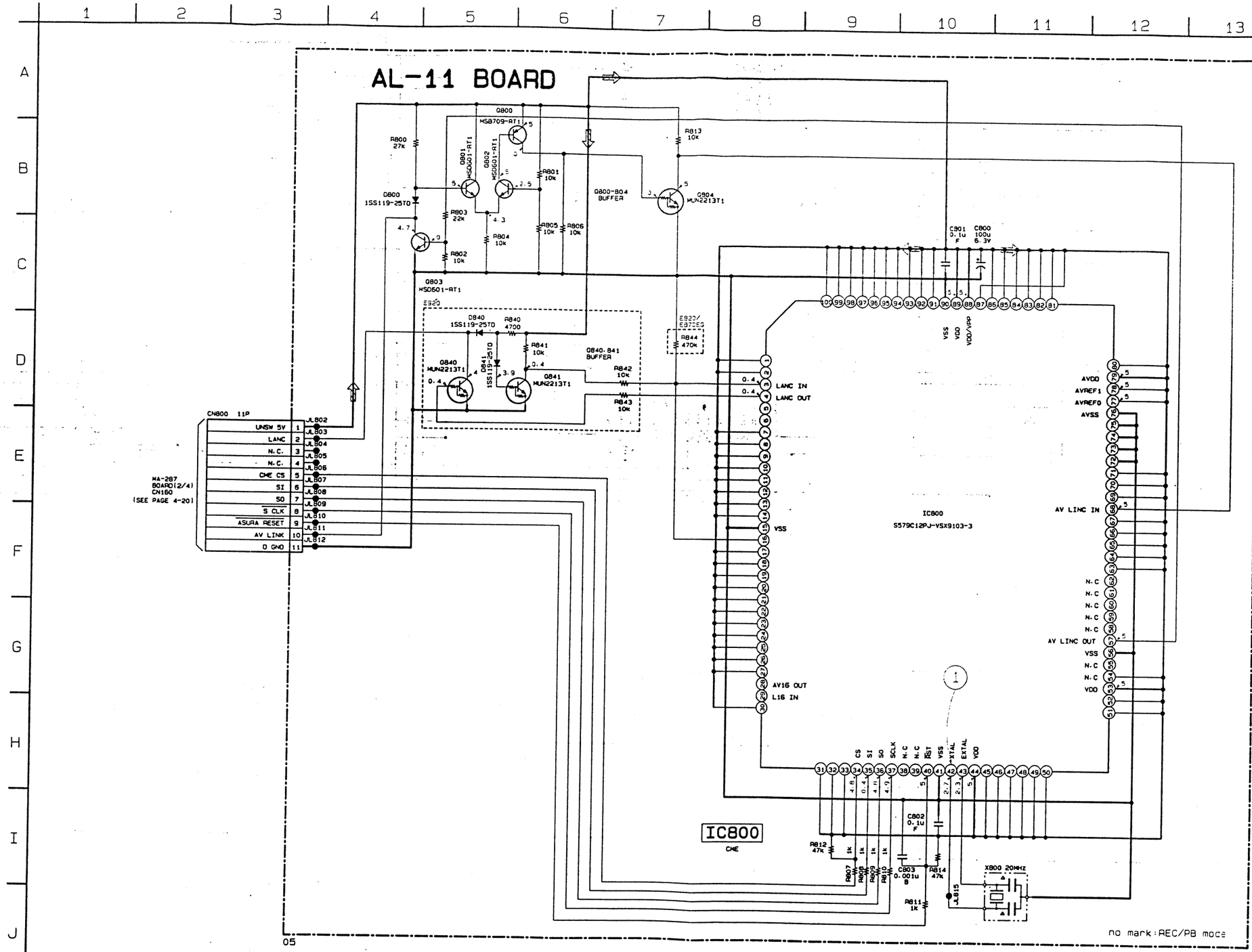
D960 A-4

IC960 B-3
IC961 A-2
IC980 B-1

Q960 A-2
Q961 A-2

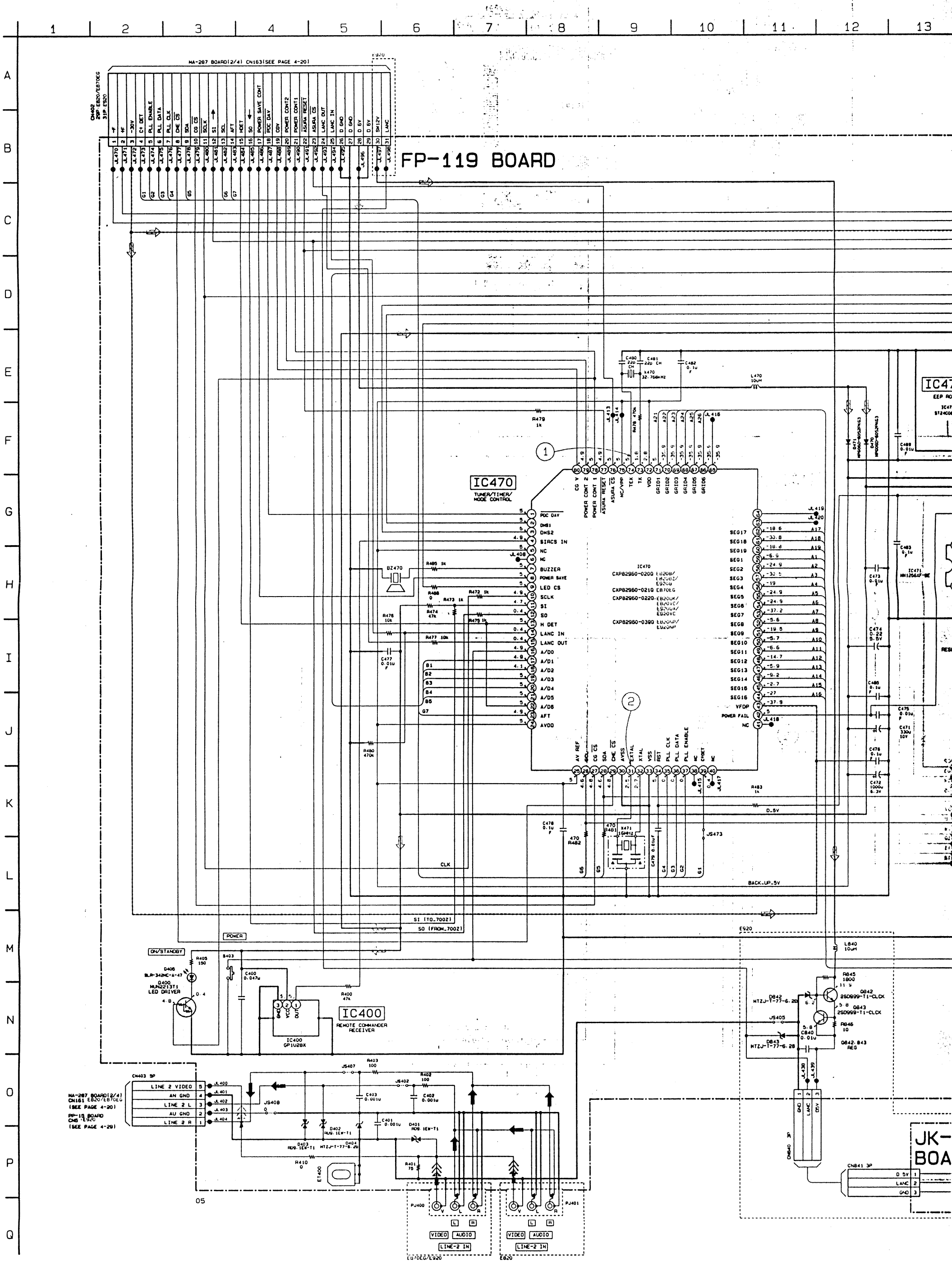
There are few ca

AL-11 BOARD


Q800
MSB709-RT1
R800 27k
Q801 MSD601-RT1
Q802 MSD601-RT1
R801 10k
R813 10k
D800 1SS119-2STD
R803 22k
R804 10k
R805 10k
R806 10k
R802 10k
Q800-804 BUFFER
Q804 MUN2213T1
Q803 MSD601-RT1
ES20
D840 1SS119-2STD
R840 4700
R841 10k
Q840 MUN2213T1
D841 1SS119-2STD
Q841 MUN2213T1
Q840.841 BUFFER
R842 10k
R843 10k
ES20/ ES72ES
R844 470K
C801 0.1u F
C800 100u 6.3V
CN800 11P
UNSW 5V 1
LANC 2
N.C. 3
N.C. 4
CME CS 5
SI 6
SO 7
S CLK 8
ASURA RESET 9
AV LINK 10
0 GND 11
MA-287 BOARD(2/4) CN160 (SEE PAGE 4-20)
LANC IN
LANC OUT
VSS
AV16 OUT
L16 IN
IC800
S579C12PJ-VSX9103-3
AVDD
AVREF1
AVREF0
AVSS
AV LINC IN
N.C
AV LINC OUT
VSS
VDD
CS
SI
SO
SCLK
RST
XTAL
EXTAL
C802 0.1u F
C803 0.001u B
R812 47k
R814 47k
R811 1k
X800 20MHz
IC800
CME
no mark:REC/PB mode
05

DM-62 (CLICK SHUTTLE), FR-119 (MODE CONTROL), JK-152 (LANC JACK) SCHEMATIC DIAGRAM

– Ref. No.: DM-62, FR-119 and JK-152 board; 1,000 series –



11 12 13 14 15 16 17 18 19 20 21 22 23 24

IC472
EEP ROM
IC472
ST24C08FM6TR

IC471
POWER FAIL DET
RESET PULSE GENERATOR

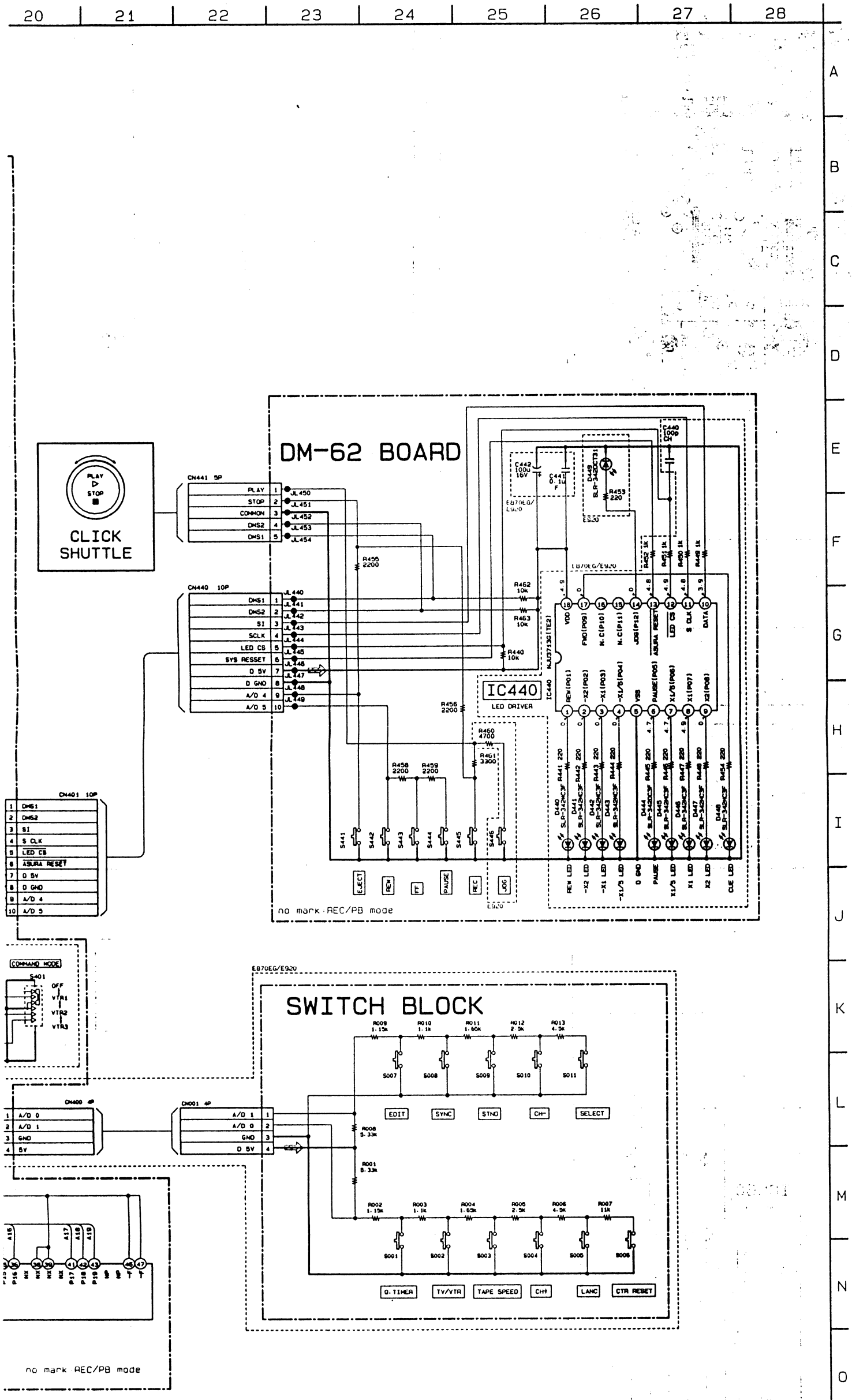
CLICK
SHUTTLE

DM-62 BOA

SWITCH B

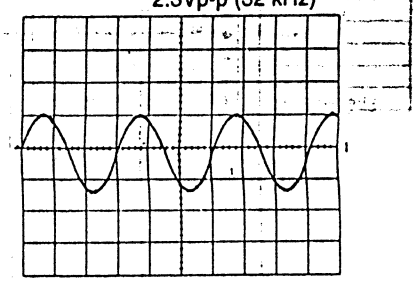
JK-152
BOARD

no mark:REC/PB mode

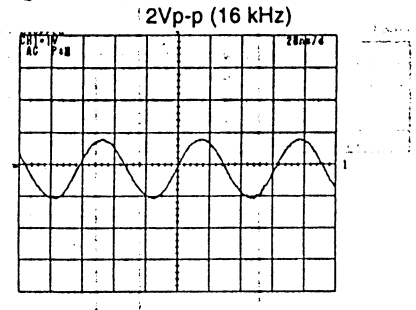


• **Waveforms**

❶ IC470 ⑭ REC/PB
2.3Vp-p (32 kHz)



❷ IC470 ㉘ REC/PB
2Vp-p (16 kHz)



• Signal path

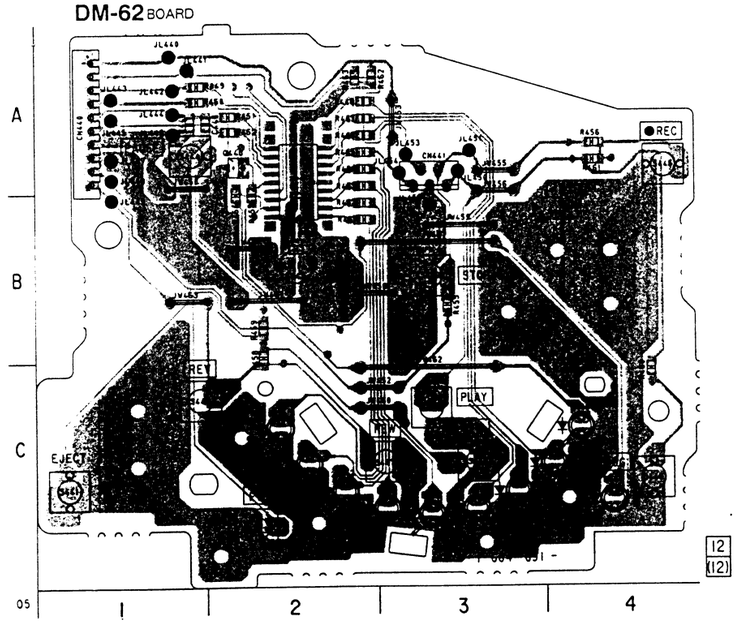
	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	⇨	➡
PB	⇨	⇨

DM-62 (CLICK SHUTTLE), FR-119 (MODE CONTROL), JK-152 (LANC JACK) PRINTED WIRING BOARDS

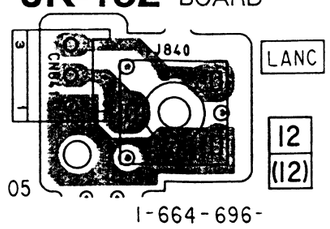
– Ref. No.: DM-62, FR-119 and JK-152 board; 1,000 series –

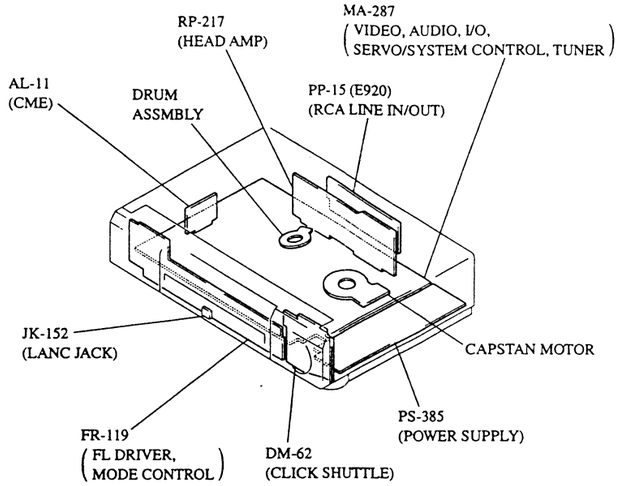
There are few cases that the part isn't mounted in this model is printed on this diagram.

DM-62 BOARD



JK-152 BOARD





DM-62 BOARD

CN440 A-1
CN441 A-3

D440 C-2
D441 C-2
D442 C-2
D443 C-3
D444 C-3
D445 C-3
D446 C-3
D447 C-4
D448 C-4
D449 C-4

IC440 A-2

FR-119 BOARD

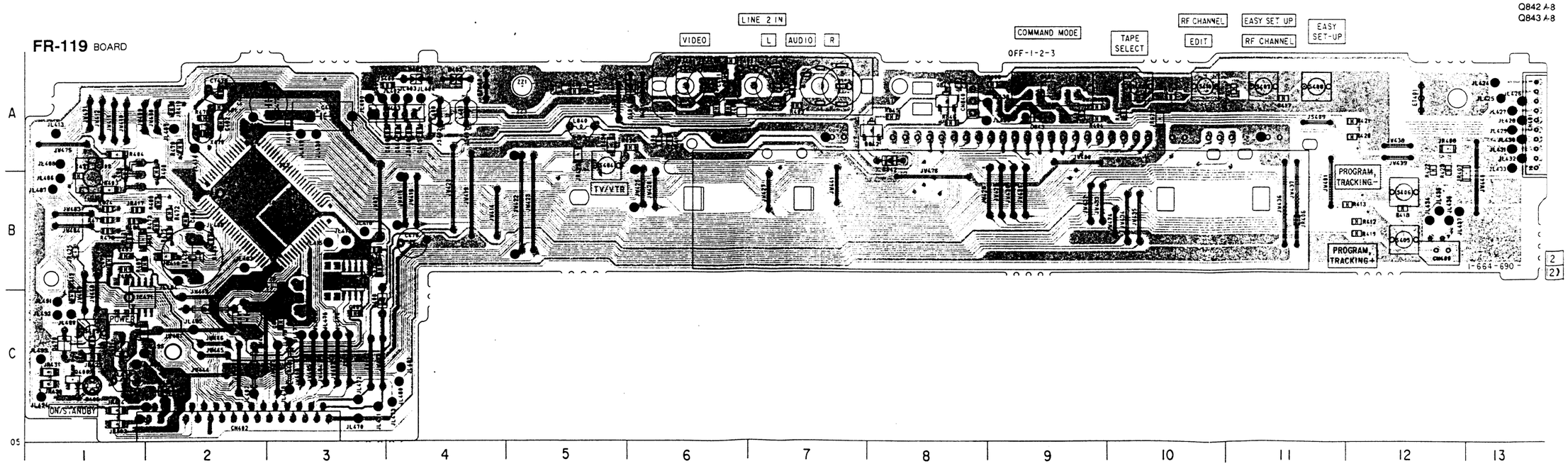
CN400 B-12
CN401 A-13
CN402 C-2
CN403 A-4
CN840 A-8

D401 A-5
D402 A-4
D403 A-4
D404 A-6
D405 C-1
D408 C-3
D470 C-1
D471 C-1
D842 A-8
D843 A-7

IC400 B-1
IC470 B-3
IC471 C-1
IC472 B-3

Q400 C-1
Q842 A-8
Q843 A-8

FR-119 BOARD

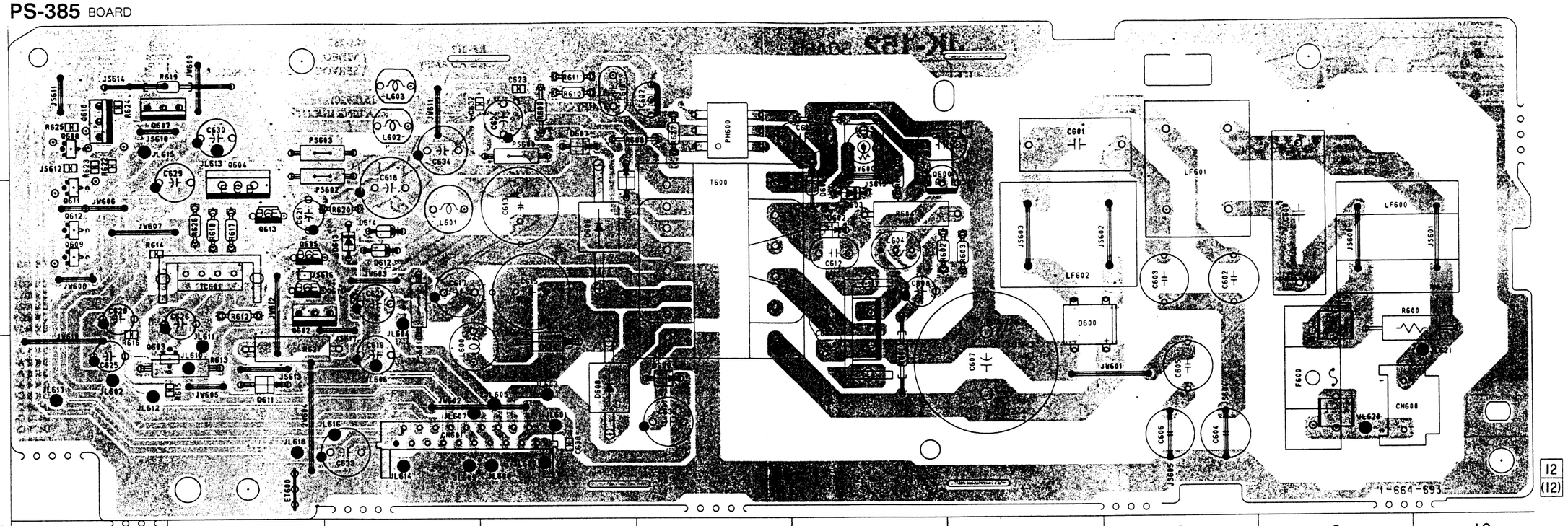


PS-385 (POWER SUPPLY) PRINTED WIRING BOARD

– Ref. No.: PS-385 board; 1,000 series –

There are few cases that the part isn't mounted in this model is printed on this diagram.

PS-385 BOARD



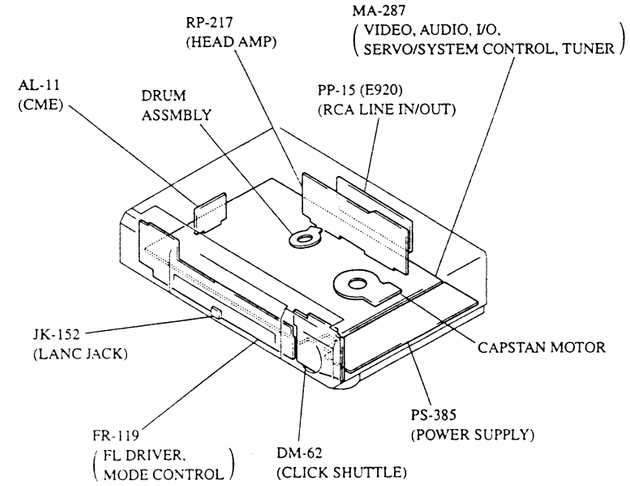
PS-385 BOARD

CN600 C-9
CN601 C-3

D600 C-7
D602 B-6
D603 B-6
D604 B-6
D605 A-4
D606 B-4
D607 A-4
D608 C-4
D609 C-5
D610 C-4
D612 B-3
D613 B-3
D614 B-3

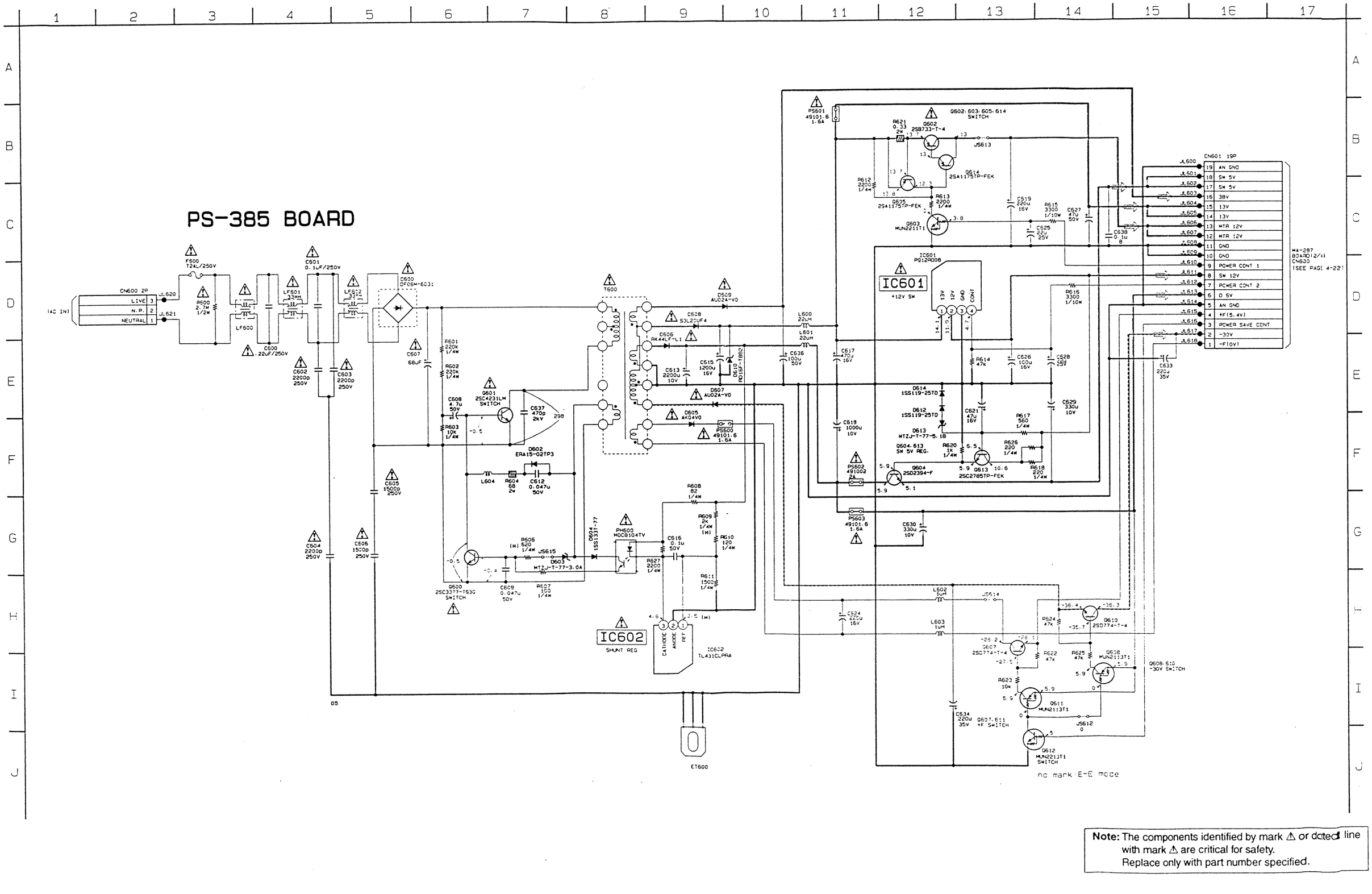
IC601 B-2
IC602 A-5

Q600 B-6
Q601 B-6
Q602 B-2
Q603 C-1
Q604 A-2
Q605 B-2
Q607 A-1
Q608 A-1
Q610 A-1
Q611 B-1
Q612 B-1
Q613 B-2
Q614 B-2



PS-385 (POWER SUPPLY) SCHEMATIC DIAGRAM

– Ref. No.: PS-385 board; 1,000 series –



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. SYSTEM CONTROL – VIDEO BLOCK INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	STOP FF/ REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
RF SWP- (SW30)	MA-287 IC160①	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
QVD	MA-287 IC160④	O	L	L	L	*2	*3	*3	*3	*3	*3	L	L
$\overline{SP}$	MA-287 IC160⑬	O	*4	*4	*4	*5	*5	*5	*5	*5	*5	*4	*4
V SYNC	MA-287 IC160⑯	I	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
NT JUDGE	MA-287 IC160⑬	O	L	L	L	L	L	L	L	L	L	L	L

*1. Synchronized with drum rotation. 25 Hz 50% duty pulse.
*2. Normally "L". "H" when CTL signal is not generated.
*3. V period "H" pulse.
*4. Selected by REC mode: "H" LP mode.
*5. Selected by tape recording mode.
*6. Composite Sync signal (positive).

5-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD -ING	TAPE UNTHREAD -ING	PB	PB • PAUSE	SLOW	CUE	× 2	REVIEW	REC	REC • PAUSE
REC CTL	MA-287 IC160⑦	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
$\overline{CAP\ STOP}$	MA-287 IC160㉟	O (O.D)	L	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	L	*3	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)
STEP PLS	MA-287 IC160㊴	O	L	L	L	L	L	L	L	*2	L	L	L	L	L
$\overline{PB\ CTL}$	MA-287 IC160㊲	I	H	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H
DRM PG	MA-287 IC160㊽	I	*4	*1	*1	*5	*5	*1	*1	*1	*1	*1	*1	*1	*1
DRM FG	MA-287 IC160㊾	I	*4	*7	*7	*5	*5	*7	*7	*7	*7	*7	*7	*7	*7
CAP FG	MA-287 IC160㊿	I	H/L	*6	*6	*5	*5	*6	H/L	*2	*6	*6	*6	*6	H/L
CAP DA	MA-287 IC160㊸	O	*8	*8	*8	*8	*8	*9	*8	*8	*9	*9	*9	*9	*8
DRM DA	MA-287 IC160㊹	O	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
CTL RESET	MA-287 IC160⑧	O	*13	*6	*6	*13	*13	*1	*13	*12	*6	*6	*6	*1	*13

*1. 25 Hz pulse.
*2. Pulse at tape running.
*3. Reverse logic pulse of STEP PLS.
*4. "L" when drum rotation stop.
*5. Unstable period pulse.
*6. Pulse of period in proportion to tape speed.
*7. 300 Hz pulse.
*8. Pulse at tape running.
*9. Approx. 2 msec period "H" or "L" pulse.
*10. Approx. 1.5 msec period "H" or "L" pulse.
*11. Approx. 3 msec period "H" or "L" pulse.
*12. "L" when FWD SLOW.
*13. Approx 2.5V

5-3. SYSTEM CONTROL – MECHANISM INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
CAM 2	MA-287 IC160⑨	O	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L
CAM 1	MA-287 IC160⑩	O	L	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L
MODE 1	MA-287 IC160㉒	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2	MA-287 IC160㉑	I	L	L	L	*1	*1	L	L	L	H	H	H	H	H	H	H	H
MODE 3	MA-287 IC160⑳	I	L	L	L	*1	*1	H	H	H	L	H	H	L	L	H	L	H
MODE 4	MA-287 IC160⑲	I	L	H	H	*1	*1	H	L	L	L	L	L	L	L	L	L	L
CIN (REC PRF)	MA-287 IC160⑮	I	L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
TREEL FG	MA-287 IC160㊹	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
SREEL FG	MA-287 IC160㊸	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
T/E LED	MA-287 IC160㉜	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
$\overline{\text{CAP STOP}}$	MA-287 IC160㉟	O (O.D)	L	L	L	H	H	L	H	H	H	L	*5	H	H	H	H	L
CAP RVS	MA-287 IC160㉞	O	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
CAP DA	MA-287 IC160㉝	O																
T SENS	MA-287 IC160㊶	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
S SENS	MA-287 IC160㊷	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6

*1. Uncertainty.
*2. "L" when erasing protection tab is bent, "H" when not bent.
*3. Pause of period in proportion to reel rotating speed.
*4. Approx. 2 msec period "H" pulse.
*5. Pulse at tape running.
*6. Normally "L", 2 msec period "H" pulse when tape top or tape end is detected.

5-4. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	I/O level
$\overline{\text{ASURA RESET}}$	MA-287 IC160㊵	I	Normally "H", "L" when service interruption is detected or restored.
$\overline{\text{ASURA CS}}$	MA-287 IC160㊹	I	Chip select signal from timer microprocessor. V period "L" pulse.
S IN 0	MA-287 IC160㊺	I	Serial communication data from timer microprocessor. V period "L" pulse.
S OUT 0	MA-287 IC160㊻	O	Serial communication data to timer microprocessor. V period "L" pulse.
$\overline{\text{S CLK}}$	MA-287 IC160㊼	I	Serial communication clock with timer microprocessor. V period "L" pulse.

5-5. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-287 BOARD IC160)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
AF ENV	MA-287 IC160㊾	I	AF RF envelope signal input terminal for automatic tracking.										
A MUTE	MA-287 IC160㉛	O (O.D)	L	L	L	*1	H	H	H	H	H	L	L
AF REC $\bar{P}$	MA-287 IC160②	O	L	L	L	L	L	L	L	L	L	H	L
AF SWP	MA-287 IC160⑱	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
$\overline{\text{FULL ERS}}$	MA-287 IC160㊱	O (O.D)	H	H	H	H	H	H	H	H	H	L	H

*1. 25 Hz 50% duty pulse approx. 5 msec delayed from RF SW P.

5-6. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION
(MA-287 BOARD IC160 CXP-87852-016Q)

Pin No.	Pin name	I/O	Function
1	RF SWP	O	RF switching pulse output
2	AF REC P	O	Hi-Fi record pulse output
3	N.C.	–	Not used
4	Q VD	O	Quasi VD pulse output
5	AUTO PRESET	O	"H" during auto preset
6	FE ON	O	Flying erase ON/OFF
7	REC CTL	O	REC CTL signal output
8	CTL RESET	O	CTL reset signal output
9	CAM1	O	CAM motor control 1
10	CAM2	O	CAM motor control 2
11	TA MUTE	O	Tuner audio mute output
12	SECAM DET	I	SECAM detect
13	NT JUDGE	I	NTSC judgement input
14	MESECAM	I	MESECAM judgement input
15	CIN (REC PRF)	I	Erasing protection tab, cassette IN detection input
16	AV CONT	O	TV/VTR control
17	N.C.	–	Not used
18	SW 1	O	BG/L control signal
19	MODE 4	I	Mechanism section CAM encoder input
20	MODE 3	I	Mechanism section CAM encoder input
21	MODE 2	I	Mechanism section CAM encoder input
22	MODE 1	I	Mechanism section CAM encoder input
23	N.C.	–	Not used
24	PAL PLUS CONT	O	Line in 3 input select
25	N.C.	–	Not used
26	N.C.	–	Not used
27	N.C.	I	Not used
28	SDA	I	IIC data line (VIDEO, Hi-Fi)
29	N.C.	I	Not used
30	SCL	I	IIC clock line (VIDEO, Hi-Fi)
31	A MUTE	O	AUDIO mute output
32	T/E LED	O	T/E LED output
33	N.C.	–	Not used
34	N.C.	–	Not used
35	CAP STOP	O	Capstan STOP signal output
36	FULL ERS	O	Full erase control
37	N.C.	O	Not used
38	N.C.	O	Not used
39	MP	I	Fixed to L
40	ASURA RESET	I	System reset input
41	VSS	–	GND
42	XTAL	–	System clock 16 MHz
43	EXTAL	–	System clock 16 MHz
44	ASURA CS	I	S/S microcomputer chip select signal
45	S IN 0	I	Serial communication signal
46	S OUT 0	O	Serial communication signal
47	SCLK	O	Serial communication signal
48	N.C.	O	Not used
49	N.C.	O	Not used
50	N.C.	–	Not used

Pin No.	Pin name	I/O	Function
51	SW2	O	BG/L' control signal
52	AVSS	–	UNSW GND
53	AVREF	–	AD port reference input UNSW 5V
54	AVDD	–	UNSW 5V
55	NTPB SW	I	NTSC PB switch input
56	AV ADJ	I	Hi-Fi/RF switching adjustment mode
57	FOLLOW TV	I	Synchro TP detect signal
58	N.C.	I	Not used
59	AF ENV	I	Hi-Fi audio playback signal envelope
60	RF ENV	I	Video playback signal envelope
61	T SENS	I	Take up end sensor input
62	S SENS	I	Supply end sensor input
63	S REEL FG	I	S side reel FG input
64	T REEL FG	I	T side reel FG input
65	N.C.	–	Not used
66	V SYNC	I	Composite sync input
67	PB CTL	I	Playback CTL input
68	DRM PG	I	Drum PG input
69	DRM FG	I	Drum FG input
70	CAP FG	I	Capstan FG input
71	BLUE BACK ON	O	SECAM color control
72	CAP RVS	O	Capstan reverse control H when Reverse
73	CAP DA	O	Capstan error D/A output
74	DRUM DA	O	Drum PG input
75	(CTL REC)	–	Not used
76	(CTL STEP)	–	Not used
77	REC COUNT	I	5V Record count input (Hi)
78	N.C.	–	GND
79	N.C.	–	Not used
80	DATA (SSB)	I/O	Signal for serial communication
81	CLOCK (SSB)	I/O	Signal for serial communication
82	N.C.	–	Not used
83	N.C.	–	Not used
84	CAP TRQ PWM	O	Capstan TRQ PWM output
85	N.C.	–	Not used
86	N.C.	–	Not used
87	N.C.	–	Not used
88	VSS	–	GND
89	VDD	–	5V
90	5V	–	5V
91	N.C.	–	Not used
92	CTL GAIN	O	CTL gain signal output
93	SP	O	Tape speed Select
94	N.C.	–	Not used
95	N.C.	–	Not used
96	REC	O	"H" output when hi-fi audio REC
97	N.C.	–	Not used
98	N.C.	–	Not used
99	STEP PLS	O	Step pulse H when Capstan step driving
100	AF SWP	O	AF switching pulse output

5-7. TUNER/TIMER MODE CONTROL PIN FUNCTION (FR-119 BOARD IC470 CXP82960-001Q)

Pin. No.	Pin Name	I/O	Function
1	$\overline{\text{PDC DAV}}$	–	Line 21H output pulse. Pulse signal synchronized with line 21 of input video signal.
2	DMS1	I	DMS 1 input
3	DMS2	I	DMS 2 input
4	SIRCS IN	I	SIRCS signal input
5	N.C.	–	Not used
6	N.C.	–	Not used
7	BUZZER	O	Buzzer output
8	POWER SAVE	O	Power supply control signal output
9	LED CS	O	LED driver chip select signal
10	SCK0	O	Clock for serial communication
11	SI	I	Serial data input
12	SO	O	Serial data output
13	H DET	I	Video signal detect signal input
14	LANC IN	I	LANC input
15	LANCE OUT	O	LANC output
16	A/D0	I	Key reading A/D input
17	A/D1	I	Key reading A/D input
18	A/D2	I	Key reading A/D input
19	A/D3	I	Key reading A/D input
20	A/D4	I	Key reading A/D input
21	A/D5	I	Key reading A/D input
22	A/D6	I	Key reading A/D input
23	AFT	I	AFT input
24	AVDD	–	UNSW 5V
25	AV REF	–	AD port reference input UNSW 5V
26	SCL	O	I²C BUS (clock)
27	CG $\overline{\text{CS}}$	O	Character generator chip select signal
28	SDA	O	I²C BUS (data)
29	CME $\overline{\text{CS}}$	O	CME chip select signal
30	AVSS	–	UNSW GND
31	EXTAL	–	System clock
32	XTAL	–	
33	VSS	–	GND
34	$\overline{\text{RST}}$	I	Reset signal in
35	PLL CLK	O	Tuner clock signal
36	PLL DATA	O	Tuner data signal
37	PLL ENABLE	O	Tuner enable signal
38	N.C.	–	Not used
39	C+DET	I	CANAL + detection
40	N.C.	–	Not used

Pin. No.	Pin Name	I/O	Function
41	N.C.	–	Not used
42	POWER FAIL	I	Power failure detect input
43	VFDP	–	–30V
44-62	SEG 1-19	O	LCD segment output
63	N.C.	–	Not used
64	N.C.	–	Not used
65	N.C.	–	Not used
66-71	GRID 6-1	O	LCD grid output
72	VDD	–	UNSW 5V
73	TX	–	Connected to oscillator for clock
74	TEX	–	
75	NC/VPP	–	Connect to +5V
76	ASURA $\overline{\text{CS}}$	O	S/S microcomputer chip select
77	$\overline{\text{SYS RESET}}$	O	System reset signal output
78	POWER CONT 1	O	Power supply control signal output
79	POWER CONT 2	O	Power supply control signal output for EDS
80	CG V	I	Vertical sync. signal input

5-8. CME PIN FUNCTION (AL-11 BOARD IC800)

Pin. No.	Pin Name	I/O	Function
1, 2		–	Connect to UNSW 5V
3	LANC IN	I	LANC input
4	LANC IN	O	LANC output
5, 6		–	Not used
7-14		–	Connect to UNSW 5V
15	VSS	–	GND
17-27		–	Connect to UNSW 5V
28	AV 16 OUT	–	Not used
29	L 16 IN	–	Not used
30-33		–	Connect to UNSW 5V
34	CS	I	Chip select signal
35	SI	I	Serial data input
36	SO	O	Serial data output
37	SCLK	I	Clock for serial communication
38, 39	N.C.	–	Not used
40	$\overline{RST}$	I	Reset signal in
41	VSS	–	GND
42	XTAL	–	System clock
43	EXTAL	–	
44	VDD	–	UNSW5V
45-52			Connect to UNSW 5V
53	VDD	–	UNSW 5V
54	N.C.	–	Not used
55	N.C.	–	Not used
56	VSS	–	GND
57	AV LINC OUT	O	System LINC output
58-62		–	Not used
63-67		–	Connect to UNSW 5V
68	AV LINC IN	I	System LINC input
69-71		–	Connect to UNSW 5V
72-75		–	Connect to GND
76	VSS	–	GND
77	AVREF0	–	Connect to UNSW 5V
78	AVREF1	–	Connect to UNSW 5V
79	AVDD	–	UNSW 5V
80-87		–	Connect to UNSW 5V
88	VDD/VPP	–	UNSW 5V
89	VDD	–	UNSW 5V
90	VSS	–	GND
91-100		–	Connect to UNSW 5V

During the adjustment, see the Parts Arrangement Diagram for Adjustment on page 6-8.

6-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT IV.

6-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used.

1) Color TV
2) Oscilloscope 1or 2 phenomena, band more than 30 MHz, delev mode, as provided.
3) Frequency counter (min. 8 digits)
4) PAL pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio generator
8) Modulation Analyzer
9) Distortion factor meter
10) Attenuator
11) Alignmeter tape
    Part Code: 8-192-605-36 (KRV-51P)
13) Extension cable (13P)
    Part code: J-6090-054-A
    RP-217 (CN260) ↔ DRUM

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

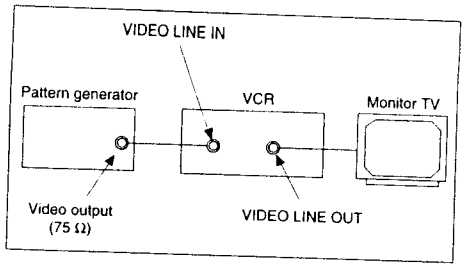


Fig. 6-2-1

2-1-3. Set-up of Adjutment

In this adjustment, PAL pattern generator is connected with LINE input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal NTSC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst signal and "red" signal are 0.30: 0.66. Fig. 6-2-2. shows video signals (color bars) used in adjusting the video section.

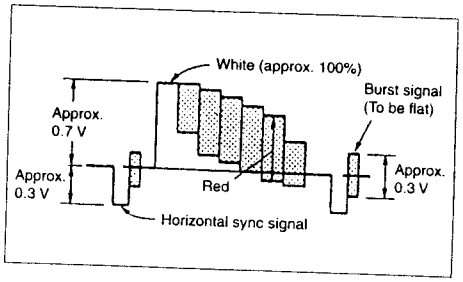


Fig. 6-2-2.

2-1-4. Alignment Tape
[Alignment Tape (KRV-51P)]

	Mode	Time	Video signal	Audio signal (HiFi/Normal)
1	SP	Seven minutes	Color bar	400 Hz
2		Three minutes	Monoscope	400 Hz
3	EP	Seven minutes	Color bar	400 Hz
4		Three minutes	Monoscope	400 Hz

2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video inputs
LINE IN : phono jacks
EURO-AV : 21-pin (Pin ⑳) 1 Vp-p, 75Ω, unbalanced, sync nagative

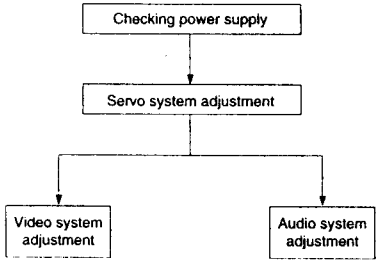
Audio inputs
LINE IN : phono jack
47 kW, -75 dBs (0 dBs = 0.775 Vrms)
EURO-AV : 21-pin (Pin ② and ⑥)
More than 10 kΩ, -4 dBs

Video outputs
LINE OUT : phono jack
EURO-AV : 21-pin (Pin ⑲) 1 Vp-p, 75Ω, unbalanced, sync negative

Audio outputs
LINE OUT : phono jacks
-7.5 dBs at load
impedance 47kΩ
Output impedance : less than 10 kΩ
EURO-AV : 21-pin (Pin ① and ③)
Output impedance : less than 1 kΩ
-4dBs with 10 kΩ load

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.



2-2. POWER SUPPLY ADJUSTMENT

2-2-1. Power Supply Check (PS-385 BOARD)

Mode	E-E
Measuring Instrument	Digital voltmeter
+F, -F check	
Measurement Point	Pin ④ (+), ①(–) of CN601
Specified Value	4.6 ± 1 Vdc
-30 V check	
Measurement Point	Pin ② of , CN601
Specified Value	-29 ± 3 Vdc
D6 V check	
Measurement Point	Pin ⑥ of CN601
Specified Value	5.9 ± 0.5 V
SW12 V	
Measurement Point	Pin ⑧ of CN601
Specified Value	12 ± 1 Vdc
MTR12 V check	
Measurement Point	Pin ⑫ of CN601
Specified Value	13.2 ± 1 Vdc
+38 V check	
Measurement Point	Pin ⑯ of CN601
Specified Value	38.0 ± 3 Vdc
SW5 V check	
Measurement Point	Pin ⑰ of CN601
Specified Value	5 ± 0.5 Vdc

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO SYSTEM Adjustment

2-3-1. RF Switching Position Adjustment (RP-217 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output. Improve the interchangeability with other tapes and sets.
When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement Point	CH1: VIDEO LINE OUT CH2: Pin ② of CN261 (RP-217 board) (RF SWP)
Measuring Instrument	Oscilloscope
Specified Value	6.5 ± 0.5 H (410 ± 32μsec)

Adjusting Method:

1) Connect RP-217 board Pin ⑤ of CN261 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Check appear "Adj-rf" on FL display.
3) Using the channel + and – buttons, adjust to 410 ± 32 μsec (6.5 ± 0.5 H).

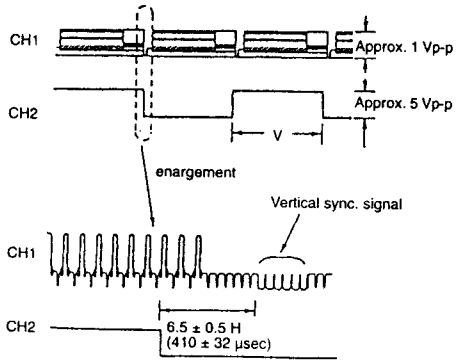


Fig. 6-2-3.

2-4. VIDEO SYSTEM ADJUSTMENT

Adjust the video system in the following sequence as a rule. The color video signal supplied from the pattern generator is used as a video input signal for video system adjustment in the recording mode.
Make sure that sync. and color burst signals meet requirements specified at set up of adjustment shown in Fig. 6-2-1.

[Adjustment Sequence]

2-4-1. Recording Y Signal Level Check
2-4-2. White Clip, Dark Clip Check
2-4-3. Playback Y Signal Level Check
2-4-4. Recording Chroma Level Check
2-4-5. Sync. AGC Check
2-4-6. X'tal Oscillation Frequency Check

2-4-1. Recording Y Signal Level Check (MA-287 Board)

Purpose:

Check the brightness signal level after passing through the V/C separating circuit.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㊷ IC201
Measurement equipment	Oscilloscope
Specified value	250 ± 50 mVp-p

Confirmation Method:

1) Confirm that the record Y level is 250 ± 50 mVp-p.

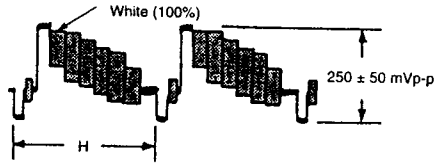


Fig. 6-2-4.

2-4-2. White Clip, Dark Clip Check (MA-287 Board)

Purpose:

Confirm that no overshoot is generated by the pre-emphasis circuit. If shifted, the signals are overmodulated, thus causing a noise in the images.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㊲ of IC201
Measurement equipment	Oscilloscope
Specified value	White clip: 190 ± 15% Dark clip: 50 ± 10%

Confirmation Method:

1) Confirm that the white clip is 190 ± 15%, on condition that the level between white and sync. is 100%.
2) Confirm that the dark clip is 50 ± 10%, on condition that the level between white and sync. is 100%

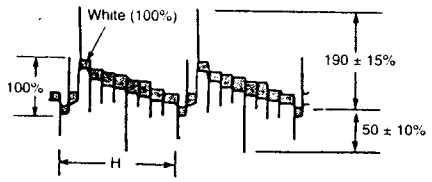


Fig. 6-2-5.

2-4-3. Playback Y Signal Level Check (MA-287 Board)

Purpose:

Confirm that the playback Y signal level is correct.

Mode	PB
Signal	Alignment tape SP color bar
Measurement point	Pin ㉘ IC201
Measurement equipment	Oscilloscope
Specified value	2.10 ± 0.18 Vp-p

Note: Make this adjustment with the EDIT switch turned off. (MA-290 Board)

Confirmation Method:

1) Confirm that the play Y level is 2.10 ± 0.18 Vp-p.

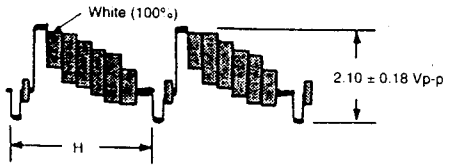


Fig. 6-2-6.

2-4-4. Recording Chroma Level Check (MA-287 Board)

Purpose:

Check the chroma signal level after passing through the Y/C separating circuit.
If shifted, the image is roughened and another color may appear on the edges.

Mode	E-E
Signal	Color bar
Measurement point	Pin ⑭ of IC201
Measurement equipment	Oscilloscope
Specified value	380 ± 40 mVp-p

Confirmation Method:

1) Confirm that the record chroma level is 380 ± 40 mVp-p.

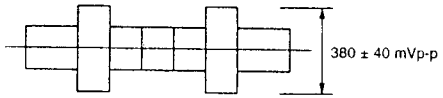


Fig. 6-2-7.

2-4-5. Sync. AGC Check (MA-287 Board)

Purpose:

Confirm that the video level is correct.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㉘ IC201
Measurement equipment	Oscilloscope
Specified value	2.10 ± 0.14 Vp-p

Note: Video output terminal must be terminated at 75 Ω.

Confirmation Method:

1) Confirm that the sync. AGC level is 2.10 ± 0.14 Vp-p.

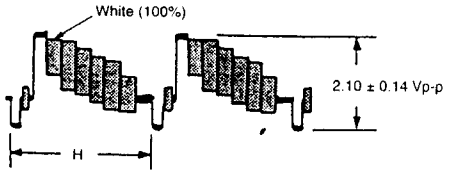


Fig. 6-2-8.

2-4-6. X'tal Oscillation Frequency Check (MA-287)

Purpose:

Confirm that the fsc is correct.

Mode	PB
Signal	Alignment tape SP color bar
Measurement point	Pin ㊿ of IC201
Measurement equipment	Frequency counter, Oscilloscope
Specified value	4,433,619 ± 96 Hz

Note: connect the frequency counter through a probe of high input impedance (about 10 MΩ) and low capacity (10 pF or less).

Confirmation Method:

1) Confirm that the frequency is 4,433,619 ± 96 Hz
2) Confirm that the amplitude is 500 ± 200 mVp-p.

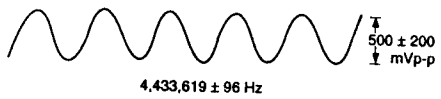


Fig. 6-2-9.

2-5. AUDIO SYSTEM ADJUSTMENTS

- Adjust both Lch and Rch.

[Connection]

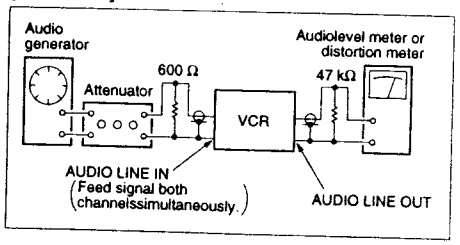


Fig. 6-2-10.

2-5-1. HI-FI Audio System Adjustment

- Set switches and knobs to the following positions to make adjustment unless otherwise specified.
  INPUT SELECT switch ..... LINE
  AUDIO MONITOR ..... STEREO

1. AF Switching Position Adjustment (RP-217 Board)

Purpose:

Adjust the interval between A CH and B CH of tape playback output. Improve the interchangeability with other tapes and sets. When it is out of order, noisy sound is increased and big noise is heard.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement point	CH1: Pin ② of CN261 (RP-217 Board) CH2: Pin ① of CN341 (RP-217 Board)
Measuring Instrument	Oscilloscope
Specified Value	Fig. 6-2-11

Adjusting Method:

1) Connect RP-217 board pin ⑤ of CN261 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Press the record button to activate the AF switching position adjustment mode.
3) Check appear "Adj-HF" on FL display.
4) Using the channels + and – buttons, minimize a chipped portion. At this time, confirm that a noisy sound is not heard.

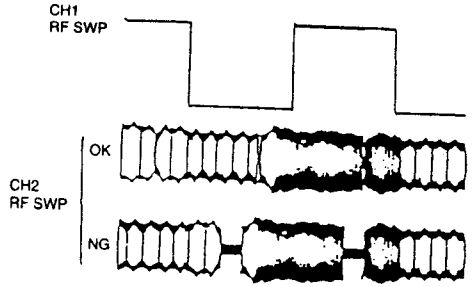


Fig. 6-2-11.

2-5-2. Normal Audio System Adjustment

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
- Set AUDIO MONITOR to normal.

[Adjustment Sequence]

1. **ACE Head Adjustment**
2. **E-E Output Level Check**
3. **Recording Bias Adjustment**
4. **Overall Level Characteristic and Distortion Factor Check**
5. **Overall S/N Check**

1. ACE Head Adjustment
Refer to the service manual of VHS MECHANICAL ADJUSTMENT IV.

2. E-E Output Level Check

Purpose:

Confirm that the output level against the reference input is within the specification.

Mode	E-E
Signal	L, R: 400 Hz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	–7.5 ± 2 dBs

Confirmation Method:

1) Simultaneously input a signal of 400 Hz, –7.5 dBs to both L and R channels of Audio Line Input.
2) Confirm that the audio output level is –7.5 ± 2 dBs.

3. Recording Bias Check

Purpose:

Confirm that the frequency characteristic is within the specification.

Mode	REC and PB (SP mode)
Signal	400 Hz, –27.5 dBs 7 kHz, –27.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	0 ± 3 dB

Note: Tape path adjustment must have been completed.

Confirmation Method:

1) Supply a signal of 400 Hz, –27.5 dBs to both L and R channels of Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate –27.5 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output level within a range of the 400 Hz playback output level 0 ± 1 dB.

4. Overall Level Characteristic and Distortion Factor Check

Purpose:

Check the record level, play level, and distortion factor against the reference input.

Mode	REC and PB (SP mode)
Signal	400 Hz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter and distortion factor meter
Specified value	Playback level: –7.5 ± 3 dBs Distortion factor: 4% or less

Confirmation Method:

1) Supply an audio signal of 400 Hz, –7.5 dBs simultaneously to both L and R channels of Audio Line Input.
2) Make recording
3) Play back a recorded portion.
4) Confirm that a playback level is –7.5 ± 3 dBs.
5) Confirm that a distortion factor is within 4%.

5. Overall S/N Check

Purpose:

Confirm that the S/N is within the specification.

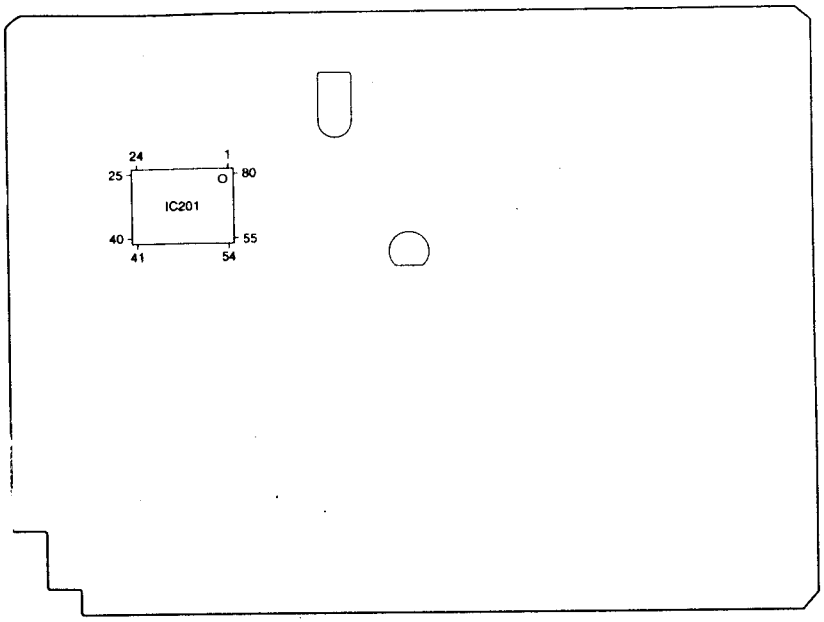
Mode	REC and PB (SP mode)
Signal	No signal
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	–46 dB or more

Confirmation Method:

1) Connect both L and R channels of audio line input to the GND.
2) Start recording.
3) Play the recorded part to confirm that the noise is below –46 dB.

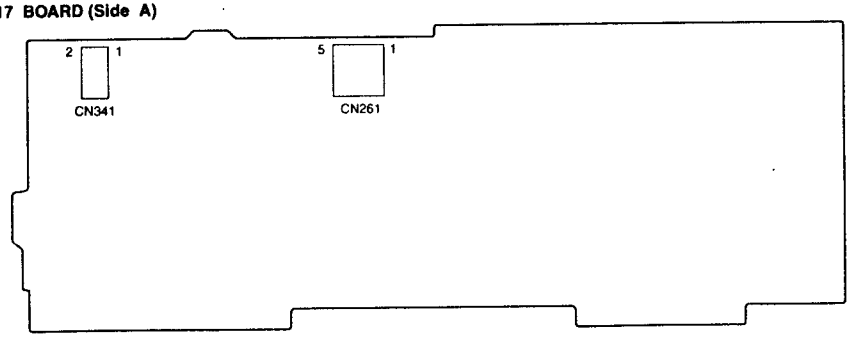
2-6. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

MA-287 BOARD (Side B)



MA-287 BOARD (Side A)

RP-217 BOARD (Side A)



PS-385 BOARD (Side A)